

TEST REPORT FIRES-FR-066-14-AUNE

**Cable bearing system BAKS with cables business Zaklady Kablove
BITNER Celina Bitner with fixing accessories of RAWLPLUG S.A.**

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TEST REPORT

FIRES-FR-066-14-AUNE

Tested property: Function in fire
Test method: STN 92 0205: 2014 (ZP-27/2008, DIN 4102-12: 1998-11)
Type of test: Accredited / Notified (NB 1396)
Date of issue: 23. 05. 2014

Name of the product: Cable bearing system BAKS with cables business Zakłady Kablowe BITNER Celina Bitner with fixing accessories of RAWLPLUG S.A.

Manufacturer: BAKS Kazimierz Sielski, ul. Jagodne 5, 05 – 480 Karczew, Poland
producer of cable bearing system

Zakłady Kablowe BITNER Celina Bitner, Friedleina 3/3, 30 009 Kraków,
Poland – producer of cables

RAWLPLUG S.A., Kwidzyńska 6, 51 – 416 Wrocław, Poland
producer of fixing accessories

Sponsor: BAKS Kazimierz Sielski, ul. Jagodne 5, 05 - 480 Karczew, Poland

Test carried out: Fires, s.r.o., Testing laboratory
Task No.: PR-14-0129
Specimens received: 07. 04. 2014
Date of the test: 10. 04. 2014

Technician responsible for the technical side of this report: Bc. Dávid Šubert

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1. INTRODUCTION

This test report contains the results of test carried out by laboratory of FIRES, s.r.o., Testing laboratory in Batizovce, accredited by SNAS for testing. Certificate of accreditation No.: S-159. The purpose of the test was to gain information for product classification.

Test of function in fire was carried out according to standard STN 92 0205. Similar standards and regulations for tests of function in fire are ZP-27/2008 PAVUS and DIN 4102-12: 1998-11.

Deviations from standard at the test according to ZP-27/2008: This test was carried out according to standard STN 92 0205 and meets also all requirements of ZP-27/2008 and test results can be directly used for classification of tested cables according to ZP-27/2008. There are no deviations identified in process and carrying out of test.

Deviations from standard at the test according to DIN 4102-12: 1998-11: This test was carried out according to standard STN 92 0205 and meets requirements of DIN 4102-12: 1998-11. Basic deviation in process and carrying out of test between these standards is in measuring and in control of temperature in the test furnace. According to STN 92 0205, plate thermometers according to EN 1363-1 are used. According to DIN 4102-12: 1998-11, common thermocouples of construction which was used for this measurement till issue of EN 1363-1 are used. Measurement by plate thermometers acc. to EN 1363-1 can be considered as stricter method of temperature control in test furnace in compare with thermocouples used till issue of EN 1363-1. Therefore, it is possible to use results of test according to STN 92 0205 for classification of tested cables according to DIN 4102-12: 1998-11, but not conversely. Identified deviation results in stricter course of test and it can lead to reduced classification of tested cables what is accepted as enhanced security in practice.

Representatives from the sponsor's side witnessing the test:

Mr. Jacek Kliczek	BAKS Kazimierz Sielski
Mr. Dariusz Gowronski	BAKS Kazimierz Sielski
Mr. Marcin Tokaj	Zakłady Kablowe BITNER Celina Bitner
Mr. Dominik Palka	Zakłady Kablowe BITNER Celina Bitner
Mr. Daniel Mazur	Koelner Polska Sp. z o.o.
Mr. Piotr Konowrocki	Koelner Polska Sp. z o.o.
Mr. Łukasz Rybarczyk	Koelner Polska Sp. z o.o.

test directed by	Ing. Marek Gorlický
test carried out by	Bc. Dávid Šubert
operator	Miroslav Hudák

2. MEASURING EQUIPMENT

Identification number	Measuring equipment	Note
F 90 004	Vertical test furnace for fire resistance testing	-
F 69 010	PLC system for data acquisition and control TECOMAT TC 700	-
F 40 017	Control and communication software to PLC TECOMAT TC 700	-
F 40 018	SW Reliance	-
F 40 019	Visual and calculating software to PLC TECOMAT TC 700	-
F 40 020	Driver Tecomat – Reliance (SW)	-
F 69 009	PLC system for data acquisition and climate control TECOMAT TC 604	-
F 60 001 - F 60 009	Sensors of temperature and relative air humidity	climatic conditions measuring



Identification number	Measuring equipment	Note
F 71 008, F 71 009	Transducer of differential pressure (-50 to + 150) Pa	pressure inside the test furnace
F 10 521 - F 10 528	Plate thermometers	temperature inside the test furnace, according to EN 1363-1
F 10 701	Sheathed thermocouple type K Ø 3 mm	ambient temperature
F 54 020	Digital calliper (0 to 200) mm	-
F 54 056	Racking meter	-
F 57 007	Digital stop-watch	-
F 96 015	Test signal panel	-

3. PREPARATION OF THE SPECIMENS

Testing laboratory didn't take off individual components of the specimens. Components take-off and its delivering to the testing laboratory were carried out by the test sponsor. Assembling of the supporting system into the test furnace and mounting of cables and weights into the supporting system was carried out by workers of BAKS Kazimierz Sielski, Zakłady Kablowe BITNER Celina Bitner and Koelner Polska Sp. z o.o. under supervision of laboratory technician.

4. PREPARATION OF THE TEST

4.1 DESCRIPTION OF THE SPECIMENS STRUCTURE

Test specimen comprised from cable bearing system BAKS Kazimierz Sielski company – cable trays, ladders and clips with accessories (consoles, supports, hangers etc.) and power and communication halogen free cables of Zakłady Kablowe BITNER Celina Bitner with fixing accessories of RAWLPLUG S.A..

Cables

Used cables by test:

Power cables:

NHXX 4x1,5RE FE180/E90 0,6/1kV	(4x)
NHXX 4x50RM FE180/E90 0,6/1kV	(4x)
NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	(4x)
NHXCH 4x50RM/25 FE180/E90 0,6/1kV	(4x)
(N)HXH 4x1,5RE FE180/E90 0,6/1kV	(4x)
(N)HXH 4x50RM FE180/E90 0,6/1kV	(4x)
(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	(4x)
(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV	(4x)
BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV	(16x)
BiTflame 1000 4x50RM FE180/E90 0,6/1kV	(16x)
BiTflame 1000 C 4x1,5RE FE180/E90 0,6/1kV	(8x)
BiTflame 1000 C 4x50RM FE180/E90 0,6/1kV	(8x)
BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	(10x)
BiTservo® FS 4G50 FE180/E90 0,6/1kV	(10x)

Communication cables:

HTKSH 1x2x0,8 FE180/PH90/E90 225V	(10x)
HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V	(8x)
HDGs 2x1,0 FE180/PH90/E90 300/500V	(18x)
HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	(10x)

The length of cables was 5,5 m and 4,0 m from that was exposed to fire.



Cable bearing systems were made of following constructions:

Suspension track No. 1 and 2

Tracks are made of three consoles combined of ceiling suspension (PSEN) and assembling profiles (CT70H50) fixed together with screws (SM M12x100). Brackets (WWCT/WWCTO400) are fixed to profiles by screws (SM M12x100). Assembling profile is reinforced in place of fixing ceiling suspension and brackets by steel sheet (BR70). Consoles are fixed to ceiling by expansion anchors R-HPTII-ZF-10080/20 in spacing of 1500 mm.

Cable ladders (DUD/DUOD400H60, steel sheet thickness 1,2 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and screws (SGK M8x14) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO) and by screws (SGK M8x14) and loaded with 15kg.m⁻¹. Cables are fixed to ladders by cable clamps (UK1/UKO1 – according to cable cross-section).

Suspension track No. 3 – 6

Tracks are made of three consoles (WPCW/WPCO1000) fixed to ceiling by expansion anchors R-HPTII-ZF-10080/20 in spacing of 1500 mm. Brackets (WMC/WMCO400) are fixed to consoles by screws (SM M10x30). Holders (UPW/UPWO) are fixed at the end of brackets with screws (SGK M8x14). Brackets are fixed through these holders by threaded rods (PG M10) with washer and nuts (M10) to ceiling by expansion anchors R-DCA-10-40.

Tracks No. 3 and 5:

Cable trays (KCP/KCOP400H60, steel sheet thickness 1,5 mm) fixed together by two junctions (LPP/LPOPH60) and screws (SGK M6x12) on sides and by junction (BL/BLO400) and screws (SGK M6x12) on the bottom. Trays are fixed to brackets by screws (SGK M6x12) and loaded with 10kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Tracks No. 4 and 6:

Cable ladders (DGOP400H60N, steel sheet thickness 1,5 mm, spacing of transoms 150 mm) fixed together by two junctions (LDC/LDOCH60) and screws (SGK M8x14) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO) and by screws (SGK M8x14) and loaded with 20kg.m⁻¹. Cables are fixed to ladders by cable clamps (UK1/UKO1 – according to cable cross-section).

Suspension tracks No. 7 and 8

Tracks are made of three consoles combined of assembling profile (CWP40H22/04; length of profile 400 mm) and two threaded rods (PG M8) fixed to expansion anchors R-DCA-08-30 at ceiling in spacing of 1500 mm.

Track No. 7:

Cable trays (KGL/KGOL300H60, steel sheet thickness 0,7 mm) fixed together by screws (SGK M6x12) and covered by cover (PKL300) with clips (ZPDH60). Trays are fixed to profiles by screws (SGK M6x12) and loaded with 15kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Track No. 8:

Cable trays (KBL300H60, steel sheet thickness 0,7 mm) fixed together by screws (SGK M6x12) and covered by cover (PKL300) with clips (ZPDH60). Trays are fixed to profiles by screws (SGK M6x12) and loaded with 15kg.m⁻¹. Cables are not fixed to trays.

Suspension track No. 9

Tracks are made of three consoles combined of assembling profile (CWP40H22/05; length of profile 500 mm) and two threaded rods (PG M10) fixed to expansion anchors R-DCA-10-40 at ceiling in spacing of 1500 mm.

Cable ladders (DUD/DUOD400H60, steel sheet thickness 1,2 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and screws (SGK M8x14) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO) and by screws (SGK M8x14) and loaded with 25kg.m⁻¹. Cables are fixed to ladders by cable clamps (UK1/UKO1 – according to cable cross-section).

**Wall tracks No. 10 – 13**

Tracks are made of three consoles combined of assembling profile (CWP/CWOP40H40/1) with brackets type (WWS/WWSO400 – tracks no. 11 and 13; WMC/WMCO400 – tracks no. 10 and 12) fixed by screws (SM M10x30). Holders (UPW/UPWO) fixed at the end of brackets with screws (SGK M8x14). Brackets are fixed through holders by threaded rods (PG M10) with washers and nuts (M10) to holder (UPWK/UPWKO) at the upper bracket. Upper holder is fixed to assembling profile by threaded rod (PG M10) and holder (WKPO). Consoles are fixed to wall in spacing of 1500 mm.

Tracks No. 10 and 11:

Cable trays (KGJ/KGOJ400H60, steel sheet thickness 0,9 mm) fixed together by screws (SGK M6x12). Trays are fixed to brackets by screws (SGK M6x12) and loaded with 15kg.m⁻¹. Cables are fixed to trays by plastic stripes.

Tracks No. 12 and 13:

Cable ladders (DUD/DUOD400H60, steel sheet thickness 1,2 mm, spacing of transoms 300 mm) fixed together by two junctions (LDC/LDOCH60) and screws (SGK M8x14) on sides. Ladders are fixed to brackets by junctions (ZM/ZMO) and by screws (SGK M8x14) and loaded with 20kg.m⁻¹. Cables are fixed to ladders by cable clamps (UK1/UKO1 – according to cable cross-section).

Wall track No. 14

Track is made of single cable clips (UDF) fixed to steel sheet 0,7 mm thick on wall by steel self-drilling screws (OC-48016) in spacing of 600 mm.

Ceiling track No. 15

Track is made of single cable clips (UDF) fixed to ceiling by anchors (GS-06040) in spacing of 600 mm.

Ceiling track No. 16

Track is made of single cable clips (UDF) fixed to ceiling by steel screws (WHO-75052) in spacing of 600 mm.

Ceiling track No. 17

Track is made of assembling profiles SDOP700 fixed to ceiling by expansion anchors (R-HPTII-ZF-08100/35) in spacing of 600 mm. Cables are fixed to profiles by cable clamps (UK1/UKO1 – according to cable cross-section).

All bearing systems were from steel, galvanized according to the Sendzimir method PN-EN 10327:2005.

More detailed information about construction of specimens is shown in the drawings which form an integral part of this test report. Drawings were delivered by sponsor.

All the information about technical specifications of used materials and semi-products, information about their type sign were delivered by sponsor. This information was not subject of the inspection of specimens. Parameters which were checked are quoted in paragraph 4.3.

4.2 DESCRIPTION OF SPECIMENS FIXATION

The test specimens were fixed on the ceiling of the test furnace which was created from concrete panels made of common shocked concrete of class B 20, 150 mm thick – 4 pieces and fixed to side walls made of aerated concrete blocks YTONG, 250 mm thick.

The type of specimen's fixation into the test furnace is shown in drawing documentation and it was selected by the sponsor.

4.3 INSPECTION OF SPECIMENS

Before and after the function in fire test, conformity of drawings and test specimens was checked. Specimens corresponded to the drawings which are part of this test report. Inspection of specimens consisted of visual review of the test specimens, used materials as well as size verification (number and cross sections of conductors, thickness, measurements of cables and trays) and also the way of specimens fixation to supporting construction was subject of inspection.



4.4 CLIMATIC CONDITIONING OF SPECIMENS

Test specimens were stored in the hall of testing laboratory under the following climatic conditions:

Ambient air temperature [°C]

mean	19,0
standard deviation	1,1

Relative air humidity [%]

mean	46,1
standard deviation	3,7

The humidity equilibrium state of test specimens was not determined. Test specimens did not comprise hygroscopic materials.

5. CARRYING OUT OF THE TEST

5.1 TEST GENERALLY

The test was carried out in horizontal test furnace with dimensions of (4000 x 3000 x 3000) mm (length x width x height).

5.2 CONDITIONS OF THE TEST

Conditions in the test furnace (temperature – standard temperature/time curve, pressure, content of O₂) as well as in the testing room (ambient temperature) corresponded to EN 1363-1 during the test. Detailed information is part of this test report, or in Quality records of the testing laboratory.

Values characterizing environment in the testing room directly before the test:

Relative air humidity [%]	Ambient air temperature [°C]
44,7	18,9

5.3 RESULTS OF THE TEST

Measured values are stated in this test report.

During the test there was no failure or damage of tracks – even during cooling down of the tracks after termination of the test.



6. CLOSING

Evaluation of the test:

Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
1	2 cables NHXCH 4x50RM/25 FE180/E90 0,6/1kV	13	90 minutes no failure / interruption
2	2 cables NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		90 minutes no failure / interruption
3	2 cables NHXH 4x50RM FE180/E90 0,6/1kV	12	90 minutes no failure / interruption
4	2 cables NHXH 4x1,5RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
5	2 cables NHXCH 4x50RM/25 FE180/E90 0,6/1kV	11	90 minutes no failure / interruption
6	2 cables NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		90 minutes no failure / interruption
7	2 cables NHXH 4x50RM FE180/E90 0,6/1kV	10	90 minutes no failure / interruption
8	2 cables NHXH 4x1,5RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
9	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	17	90 minutes no failure / interruption
10	2 cables BiTflame 1000 C 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
11	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
12	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV		90 minutes no failure / interruption
13	2 cables BiTflame 1000 C 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
14	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
15	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	9	71 minutes
16	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV		41 minutes
17	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
18	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
19	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV	8	90 minutes no failure / interruption
20	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		44 minutes
21	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV	7	90 minutes no failure / interruption
22	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
23	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	4, 6	19 minutes
24	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV		65 minutes
25	2 cables BiTflame 1000 C 4x50RM FE180/E90 0,6/1kV	6	90 minutes no failure / interruption
26	2 cables BiTflame 1000 C 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
27	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV	3, 5	42 minutes
28	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV		90 minutes no failure / interruption
29	2 cables BiTflame 1000 C 4x50RM FE180/E90 0,6/1kV	5	90 minutes no failure / interruption
30	2 cables BiTflame 1000 C 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
31	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV	16	90 minutes no failure / interruption
32	2 cables (N)HXH 4x1,5RM FE180/E90 0,6/1kV		66 minutes
33	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		90 minutes no failure / interruption
34	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
35	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV	4	90 minutes no failure / interruption
36	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
37	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV	3	90 minutes no failure / interruption
38	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
39	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV	2	67 minutes
40	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV		86 minutes
41	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV	1	90 minutes no failure / interruption
42	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption



Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
43	2 cables BiTflame 1000 C 4x1,5RE FE180/E90 0,6/1kV	15	90 minutes no failure / interruption
44	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV		90 minutes no failure / interruption
45	2 cables BiTflame 1000 C 4x50RM FE180/E90 0,6/1kV		11 minutes
46	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
47	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV	14	90 minutes no failure / interruption
48	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		90 minutes no failure / interruption
49	2 cables (N)HXH 4x1,5RM FE180/E90 0,6/1kV		90 minutes no failure / interruption
50	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		90 minutes no failure / interruption
52	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	13	44 minutes
53	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		26 minutes
54	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	12	90 minutes no failure / interruption
55	2 cables HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
56	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	11	51 minutes
57	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		50 minutes
58	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	10	90 minutes no failure / interruption
59	2 cables HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
60	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	17	90 minutes no failure / interruption
61	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	8	43 minutes
62	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	7	86 minutes
63	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	6	28 minutes
64	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	5	25 minutes
65	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	4	38 minutes
66	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	3	90 minutes no failure / interruption
67	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	2	90 minutes no failure / interruption
68	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption
69	2 cables HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V	1	90 minutes no failure / interruption
70	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
71	2 cables HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V	15	90 minutes no failure / interruption
72	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
73	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	14	90 minutes no failure / interruption
74	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption

The fire test was discontinued in 96th minute at the request of test sponsor.

Specimens S1 – S50 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Specimens S52 – S74 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V / 0,03W.

Circuit breakers with rating 3 A were used.



Measured values inside the test furnace

Time t [min]	Temperature [°C]											Deviation d _e [%]	Pressure p [Pa]
	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To		
0	24,5	25,5	24,6	25,5	26,8	27,9	27,0	27,5	26,2	20,0	18,9	0,0	19,1
5	548,2	571,5	571,2	541,7	595,8	632,0	591,3	563,4	576,9	576,0	19,0	-5,8	18,9
10	661,8	702,7	679,7	622,2	673,6	701,0	672,4	615,6	666,1	678,0	19,0	-3,7	17,4
15	734,3	764,2	752,2	695,1	741,3	754,0	745,9	696,5	735,4	739,0	19,1	-2,5	17,0
20	756,6	803,0	801,6	750,2	758,2	797,4	797,6	759,6	778,0	781,0	19,1	-1,9	18,9
25	799,1	845,1	846,9	803,0	804,4	840,4	842,5	828,3	826,2	815,0	19,2	-1,3	17,0
30	799,5	847,0	853,6	842,0	809,1	859,9	875,5	872,4	844,9	842,0	19,2	-0,9	19,6
35	822,3	868,2	883,7	877,5	837,5	885,5	895,8	906,9	872,2	865,0	19,3	-0,6	18,9
40	845,7	890,0	904,0	892,7	858,7	905,2	916,3	917,9	891,3	885,0	19,3	-0,4	19,3
45	862,1	899,6	903,7	885,4	885,6	937,1	924,6	900,5	899,8	902,0	19,4	-0,3	17,6
50	892,5	918,4	907,0	889,5	922,1	951,9	924,5	906,7	914,1	918,0	19,4	-0,3	17,3
55	910,3	935,0	925,7	905,0	937,7	965,5	941,9	926,0	930,9	932,0	19,5	-0,3	18,0
60	923,6	954,4	948,7	918,0	936,1	960,2	964,7	938,6	943,0	945,0	19,5	-0,3	18,5
65	940,2	968,9	958,6	930,9	949,7	969,1	971,6	945,1	954,3	957,0	19,6	-0,3	18,1
70	957,8	986,6	969,7	935,9	968,4	987,6	983,2	952,8	967,8	968,0	19,6	-0,3	17,8
75	964,7	993,4	979,1	944,4	975,6	991,8	990,9	961,1	975,1	979,0	19,7	-0,3	17,8
80	968,6	995,9	988,6	960,3	980,9	1007,1	1006,5	979,0	985,9	988,0	19,7	-0,3	18,1
85	975,2	997,0	990,9	965,7	996,3	1015,5	1011,5	991,4	992,9	997,0	19,8	-0,3	19,7
90	986,7	1014,6	1011,4	989,1	996,1	1018,6	1024,8	1001,2	1005,3	1006,0	19,8	-0,3	19,7
91	987,8	1015,3	1011,6	991,1	997,9	1020,2	1027,5	1004,1	1006,9	1008,0	19,8	-0,3	19,1
92	987,9	1015,4	1014,5	991,7	998,3	1020,9	1028,5	1008,9	1008,3	1009,0	19,9	-0,3	18,8
93	992,4	1020,8	1017,4	989,7	1001,0	1023,7	1029,7	1005,2	1010,0	1011,0	19,9	-0,3	19,0
94	994,1	1022,7	1019,2	991,1	1002,1	1024,2	1031,1	1007,8	1011,5	1012,0	19,9	-0,3	18,7
95	995,4	1023,6	1019,8	992,2	1004,4	1027,2	1033,3	1010,4	1013,3	1014,0	19,9	-0,3	19,1

Tave Average temperature in the test furnace calculated from plate thermometers

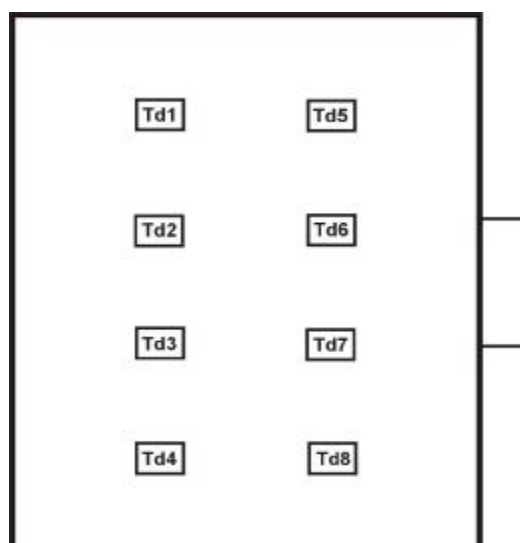
Tn Standard temperature in the test furnace laid down to test guideline

To Ambient temperature

d_e Deviation of the average temperature from the standard temperature calculated according to test guideline

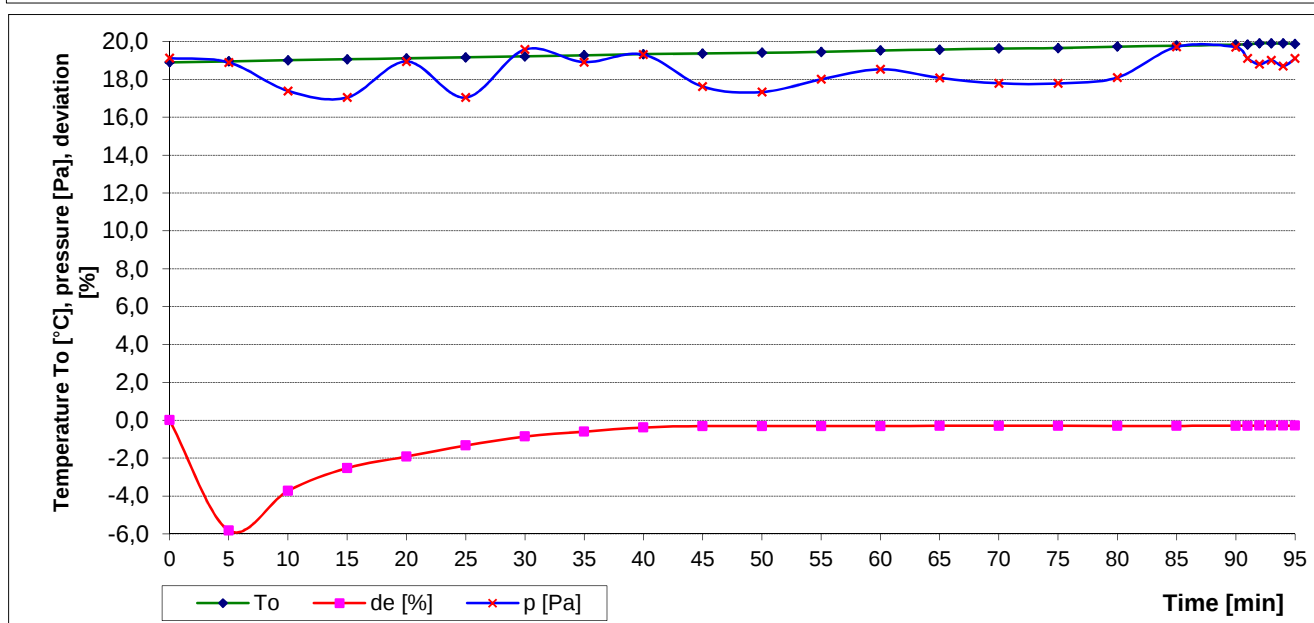
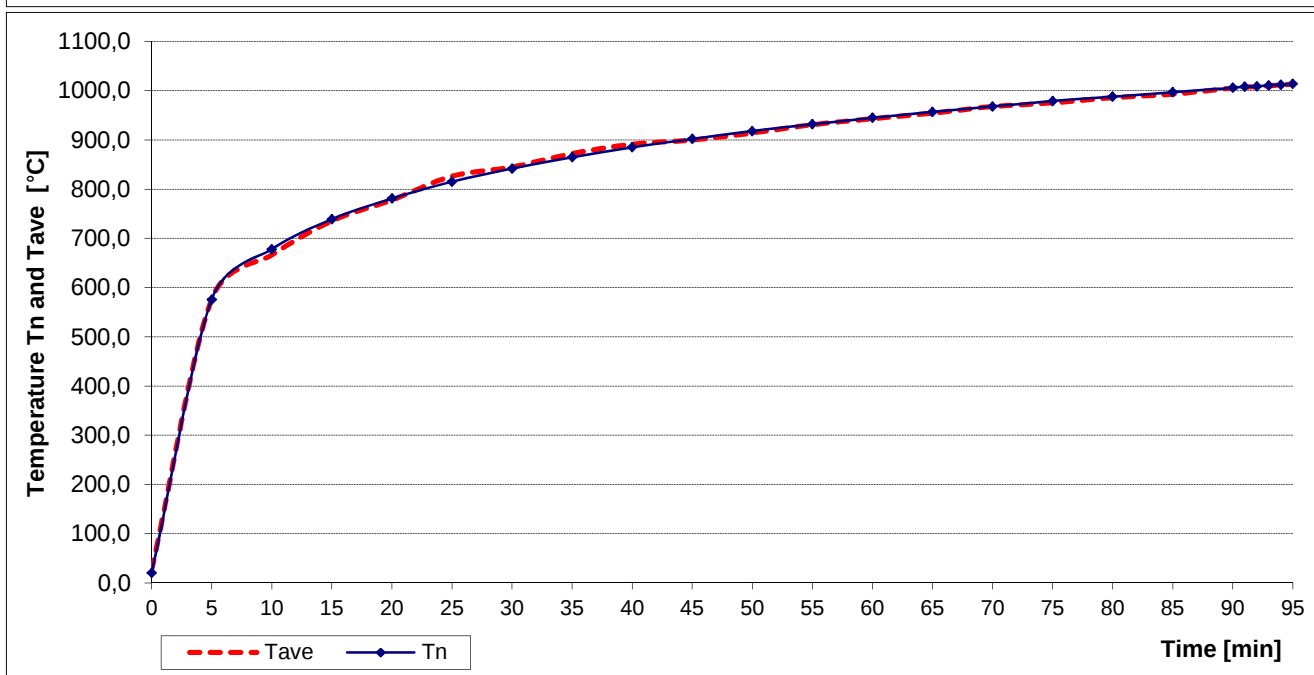
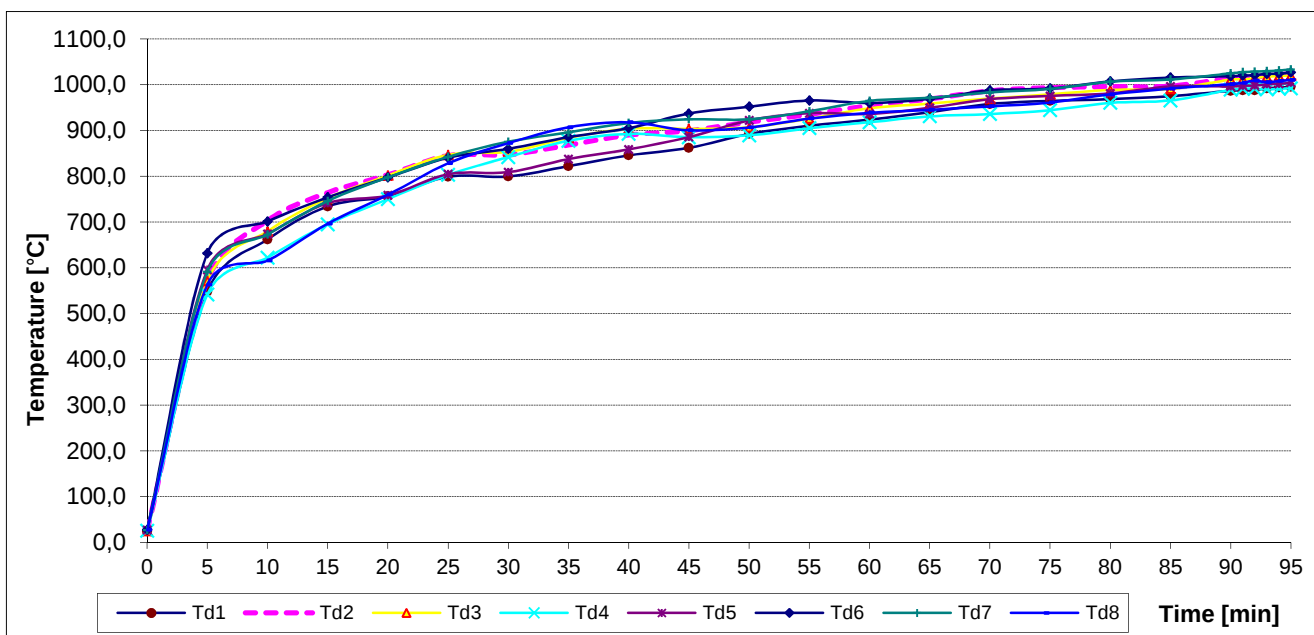
p Pressure inside the test furnace measured under the ceiling of the test furnace

Layout of measuring points inside the test furnace:





Measured values inside the test furnace /graph




Measured time of tested specimens from S1 to S10 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S1	1-L1	no failure / interruption
	2-L2	no failure / interruption
	3-L3	no failure / interruption
	4-PEN	no failure / interruption
S2	5-L1	no failure / interruption
	6-L2	no failure / interruption
	7-L3	no failure / interruption
	8-PEN	no failure / interruption
S3	9-L1	no failure / interruption
	10-L2	no failure / interruption
	11-L3	no failure / interruption
	12-PEN	no failure / interruption
S4	13-L1	no failure / interruption
	14-L2	no failure / interruption
	15-L3	no failure / interruption
	16-PEN	no failure / interruption
S5	17-L1	no failure / interruption
	18-L2	no failure / interruption
	19-L3	no failure / interruption
	20-PEN	no failure / interruption
S6	21-L1	no failure / interruption
	22-L2	no failure / interruption
	23-L3	no failure / interruption
	24-PEN	no failure / interruption
S7	25-L1	no failure / interruption
	26-L2	no failure / interruption
	27-L3	no failure / interruption
	28-PEN	no failure / interruption
S8	29-L1	no failure / interruption
	30-L2	no failure / interruption
	31-L3	no failure / interruption
	32-PEN	no failure / interruption
S9	33-L1	no failure / interruption
	34-L2	no failure / interruption
	35-L3	no failure / interruption
	36-PEN	no failure / interruption
S10	37-L1	no failure / interruption
	38-L2	no failure / interruption
	39-L3	no failure / interruption
	40-PEN	no failure / interruption

Specimen No.	Cables
1	2 cables NHXCH 4x50RM/25 FE180/E90 0,6/1kV
2	2 cables NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV
3	2 cables NHXH 4x50RM FE180/E90 0,6/1kV
4	2 cables NHXH 4x1,5RM FE180/E90 0,6/1kV
5	2 cables NHXCH 4x50RM/25 FE180/E90 0,6/1kV
6	2 cables NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV
7	2 cables NHXH 4x50RM FE180/E90 0,6/1kV
8	2 cables NHXH 4x1,5RM FE180/E90 0,6/1kV
9	2 cables Bit servo® FS 4G1,5 FE180/E90 0,6/1kV
10	2 cables Bit flame 1000 C 4x1,5RE FE180/E90 0,6/1kV

Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Circuit breakers with rating 3 A were used.


Measured time of tested specimens from S11 to S20 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S11	41-L1	no failure / interruption
	42-L2	no failure / interruption
	43-L3	no failure / interruption
	44-PEN	no failure / interruption
S12	45-L1	no failure / interruption
	46-L2	no failure / interruption
	47-L3	no failure / interruption
	48-PEN	no failure / interruption
S13	49-L1	no failure / interruption
	50-L2	no failure / interruption
	51-L3	no failure / interruption
	52-PEN	no failure / interruption
S14	53-L1	no failure / interruption
	54-L2	no failure / interruption
	55-L3	no failure / interruption
	56-PEN	no failure / interruption
S15	57-L1	71:34
	58-L2	x
	59-L3	x
	60-PEN	x
S16	61-L1	x
	62-L2	41:51
	63-L3	x
	64-PEN	x
S17	65-L1	no failure / interruption
	66-L2	no failure / interruption
	67-L3	no failure / interruption
	68-PEN	no failure / interruption
S18	69-L1	no failure / interruption
	70-L2	no failure / interruption
	71-L3	no failure / interruption
	72-PEN	no failure / interruption
S19	73-L1	no failure / interruption
	74-L2	no failure / interruption
	75-L3	no failure / interruption
	76-PEN	no failure / interruption
S20	77-L1	x
	78-L2	x
	79-L3	44:36
	80-PEN	x

Specimen No.	Cables
11	2 cables Bitflame 1000 4x1,5RE FE180/E90 0,6/1kV
12	2 cables Bit servo® FS 4G50 FE180/E90 0,6/1kV
13	2 cables Bitflame 1000 C 4x50RM FE180/E90 0,6/1kV
14	2 cables Bitflame 1000 4x50RM FE180/E90 0,6/1kV
15	2 cables Bit servo® FS 4G1,5 FE180/E90 0,6/1kV
16	2 cables Bit servo® FS 4G50 FE180/E90 0,6/1kV
17	2 cables Bitflame 1000 4x50RM FE180/E90 0,6/1kV
18	2 cables Bitflame 1000 4x1,5RE FE180/E90 0,6/1kV
19	2 cables Bitflame 1000 4x50RM FE180/E90 0,6/1kV
20	2 cables Bitflame 1000 4x1,5RE FE180/E90 0,6/1kV

- x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable
 Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
 Circuit breakers with rating 3 A were used.


Measured time of tested specimens from S21 to S30 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S21	81-L1	no failure / interruption
	82-L2	no failure / interruption
	83-L3	no failure / interruption
	84-PEN	no failure / interruption
S22	85-L1	no failure / interruption
	86-L2	no failure / interruption
	87-L3	no failure / interruption
	88-PEN	no failure / interruption
S23	89-L1	19:43
	90-L2	19:43
	91-L3	19:43
	92-PEN	x
S24	93-L1	65:54
	94-L2	65:54
	95-L3	x
	96-PEN	x
S25	97-L1	no failure / interruption
	98-L2	no failure / interruption
	99-L3	no failure / interruption
	100-PEN	no failure / interruption
S26	101-L1	no failure / interruption
	102-L2	no failure / interruption
	103-L3	no failure / interruption
	104-PEN	no failure / interruption
S27	105-L1	42:21
	106-L2	42:21
	107-L3	x
	108-PEN	x
S28	109-L1	no failure / interruption
	110-L2	no failure / interruption
	111-L3	no failure / interruption
	112-PEN	no failure / interruption
S29	113-L1	no failure / interruption
	114-L2	no failure / interruption
	115-L3	no failure / interruption
	116-PEN	no failure / interruption
S30	117-L1	no failure / interruption
	118-L2	no failure / interruption
	119-L3	no failure / interruption
	120-PEN	no failure / interruption

Specimen No.	Cables
21	2 cables Bitflame 1000 4x50RM FE180/E90 0,6/1kV
22	2 cables Bitflame 1000 4x1,5RE FE180/E90 0,6/1kV
23	2 cables Bit servo® FS 4G1,5 FE180/E90 0,6/1kV
24	2 cables Bit servo® FS 4G50 FE180/E90 0,6/1kV
25	2 cables Bitflame 1000 C 4x50RM FE180/E90 0,6/1kV
26	2 cables Bitflame 1000 C 4x1,5RE FE180/E90 0,6/1kV
27	2 cables Bit servo® FS 4G1,5 FE180/E90 0,6/1kV
28	2 cables Bit servo® FS 4G50 FE180/E90 0,6/1kV
29	2 cables Bitflame 1000 C 4x50RM FE180/E90 0,6/1kV
30	2 cables Bitflame 1000 C 4x1,5RE FE180/E90 0,6/1kV

- x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable
 Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
 Circuit breakers with rating 3 A were used.


Measured time of tested specimens from S31 to S40 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S31	121-L1	no failure / interruption
	122-L2	no failure / interruption
	123-L3	no failure / interruption
	124-PEN	no failure / interruption
S32	125-L1	x
	126-L2	x
	127-L3	66:08
	128-PEN	x
S33	129-L1	no failure / interruption
	130-L2	no failure / interruption
	131-L3	no failure / interruption
	132-PEN	no failure / interruption
S34	133-L1	no failure / interruption
	134-L2	no failure / interruption
	135-L3	no failure / interruption
	136-PEN	no failure / interruption
S35	137-L1	no failure / interruption
	138-L2	no failure / interruption
	139-L3	no failure / interruption
	140-PEN	no failure / interruption
S36	141-L1	no failure / interruption
	142-L2	no failure / interruption
	143-L3	no failure / interruption
	144-PEN	no failure / interruption
S37	145-L1	no failure / interruption
	146-L2	no failure / interruption
	147-L3	no failure / interruption
	148-PEN	no failure / interruption
S38	149-L1	no failure / interruption
	150-L2	no failure / interruption
	151-L3	no failure / interruption
	152-PEN	no failure / interruption
S39	153-L1	x
	154-L2	67:45
	155-L3	x
	156-PEN	x
S40	157-L1	x
	158-L2	x
	159-L3	x
	160-PEN	86:49

Specimen No.	Cables
31	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV
32	2 cables (N)HXH 4x1,5RM FE180/E90 0,6/1kV
33	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV
34	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV
35	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV
36	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV
37	2 cables BiTflame 1000 4x50RM FE180/E90 0,6/1kV
38	2 cables BiTflame 1000 4x1,5RE FE180/E90 0,6/1kV
39	2 cables BiTservo® FS 4G50 FE180/E90 0,6/1kV
40	2 cables BiTservo® FS 4G1,5 FE180/E90 0,6/1kV

- x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable
Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
Circuit breakers with rating 3 A were used.


Measured time of tested specimens from S41 to S48 - power cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S41	161-L1	no failure / interruption
	162-L2	no failure / interruption
	163-L3	no failure / interruption
	164-PEN	no failure / interruption
S42	165-L1	no failure / interruption
	166-L2	no failure / interruption
	167-L3	no failure / interruption
	168-PEN	no failure / interruption
S43	169-L1	no failure / interruption
	170-L2	no failure / interruption
	171-L3	no failure / interruption
	172-PEN	no failure / interruption
S44	173-L1	no failure / interruption
	174-L2	no failure / interruption
	175-L3	no failure / interruption
	176-PEN	no failure / interruption
S45	177-L1	x
	178-L2	11:10
	179-L3	x
	180-PEN	x
S46	181-L1	no failure / interruption
	182-L2	no failure / interruption
	183-L3	no failure / interruption
	184-PEN	no failure / interruption
S47	185-L1	no failure / interruption
	186-L2	no failure / interruption
	187-L3	no failure / interruption
	188-PEN	no failure / interruption
S48	189-L1	no failure / interruption
	190-L2	no failure / interruption
	191-L3	no failure / interruption
	192-PEN	no failure / interruption
S49	193-L1	no failure / interruption
	194-L2	no failure / interruption
	195-L3	no failure / interruption
	196-PEN	no failure / interruption
S50	197-L1	no failure / interruption
	198-L2	no failure / interruption
	199-L3	no failure / interruption
	200-PEN	no failure / interruption

Specimen No.	Cables
41	2 cables Bitflame 1000 4x50RM FE180/E90 0,6/1kV
42	2 cables Bitflame 1000 4x1,5RE FE180/E90 0,6/1kV
43	2 cables Bitflame 1000 C 4x1,5RE FE180/E90 0,6/1kV
44	2 cables Bitflame 1000 4x1,5RE FE180/E90 0,6/1kV
45	2 cables Bitflame 1000 C 4x50RM FE180/E90 0,6/1kV
46	2 cables Bitflame 1000 4x50RM FE180/E90 0,6/1kV
47	2 cables (N)HXH 4x50RM FE180/E90 0,6/1kV
48	2 cables (N)HXCH 4x50RM/25 FE180/E90 0,6/1kV
49	2 cables (N)HXH 4x1,5RM FE180/E90 0,6/1kV
50	2 cables (N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV

- x Conductor was turned off manually after permanent interruption / failure of other conductors in the cable
 Power cables were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
 Circuit breakers with rating 3 A were used.


Measured time of tested specimen S52 to S61 - communication cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S52A	209-L	44:14
	210-PEN	-
S52B	211-L	47:52
	212-PEN	-
S53A	213-L	62:46
	214-PEN	-
S53B	215-L	26:00
	216-PEN	-
S54A	217-L	no failure / interruption
	218-PEN	no failure / interruption
S54B	219-L	no failure / interruption
	220-PEN	no failure / interruption
S55A	221-L	no failure / interruption
	222-PEN	no failure / interruption
S55B	223-L	no failure / interruption
	224-PEN	no failure / interruption
S56A	225-L	52:17
	226-PEN	-
S56B	227-L	51:58
	228-PEN	-
S57A	229-L	61:23
	230-PEN	-
S57B	231-L	50:05
	232-PEN	-
S58A	233-L	no failure / interruption
	234-PEN	no failure / interruption
S58B	235-L	no failure / interruption
	236-PEN	no failure / interruption
S59A	237-L	no failure / interruption
	238-PEN	no failure / interruption
S59B	239-L	no failure / interruption
	240-PEN	no failure / interruption
S60A	241-L	no failure / interruption
	242-PEN	no failure / interruption
S60B	243-L	no failure / interruption
	244-PEN	no failure / interruption
S61A	245-L	no failure / interruption
	246-PEN	no failure / interruption
S61B	247-L	43:23
	248-PEN	-

Specimen No.	Cables
52	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
53	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V
54	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
55	2 cables HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V
56	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
57	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V
58	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
59	2 cables HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V
60	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
61	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V

Signal cables were tested by three-phase voltage supply 1 x 110V with LED diodes 3V / 0,03W.
Circuit breakers with rating 3 A were used.


Measured time of tested specimens from S62 to S71 - communication cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S62A	249-L	no failure / interruption
	250-PEN	no failure / interruption
S62B	251-L	86:46
	252-PEN	-
S63A	253-L	28:29
	254-PEN	-
S63B	255-L	78:45
	256-PEN	-
S64A	257-L	44:57
	258-PEN	-
S64B	259-L	25:51
	260-PEN	-
S65A	261-L	38:42
	262-PEN	-
S65B	263-L	41:38
	264-PEN	-
S66A	265-L	no failure / interruption
	266-PEN	no failure / interruption
S66B	267-L	no failure / interruption
	268-PEN	no failure / interruption
S67A	269-L	no failure / interruption
	270-PEN	no failure / interruption
S67B	271-L	no failure / interruption
	272-PEN	no failure / interruption
S68A	273-L	no failure / interruption
	274-PEN	no failure / interruption
S68B	275-L	no failure / interruption
	276-PEN	no failure / interruption
S69A	273-L	no failure / interruption
	274-PEN	no failure / interruption
S69B	275-L	no failure / interruption
	276-PEN	no failure / interruption
S70A	281-L	no failure / interruption
	282-PEN	no failure / interruption
S70B	283-L	no failure / interruption
	284-PEN	no failure / interruption
S71A	285-L	no failure / interruption
	286-PEN	no failure / interruption
S71B	287-L	no failure / interruption
	288-PEN	no failure / interruption

Specimen No.	Cables
62	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
63	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V
64	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V
65	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
66	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
67	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V
68	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
69	2 cables HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V
70	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
71	2 cables HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V

Signal cables were tested by three-phase voltage supply 1 x 110V with LED diodes 3V / 0,03W.
Circuit breakers with rating 3 A were used.


Measured time of tested specimens S72 to S74 - communication cables

Specimen	Bulbs	Time to permanent failure / interruption [min:s]
S72A	289-L	no failure / interruption
	290-PEN	no failure / interruption
S72B	291-L	no failure / interruption
	292-PEN	no failure / interruption
S73A	293-L	no failure / interruption
	294-PEN	no failure / interruption
S73B	295-L	no failure / interruption
	296-PEN	no failure / interruption
S74A	297-L	no failure / interruption
	298-PEN	no failure / interruption
S74B	299-L	no failure / interruption
	300-PEN	no failure / interruption

Specimen No.	Cables
72	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V
73	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V
74	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V

Signal cables were tested by three-phase voltage supply 1 x 110V with LED diods 3V / 0,03W.
Circuit breakers with rating 3 A were used.



PHOTOS



Photo taken before the test.



Photo taken before the test.



Photo taken before the test.



PHOTOS



Photo taken before the test.

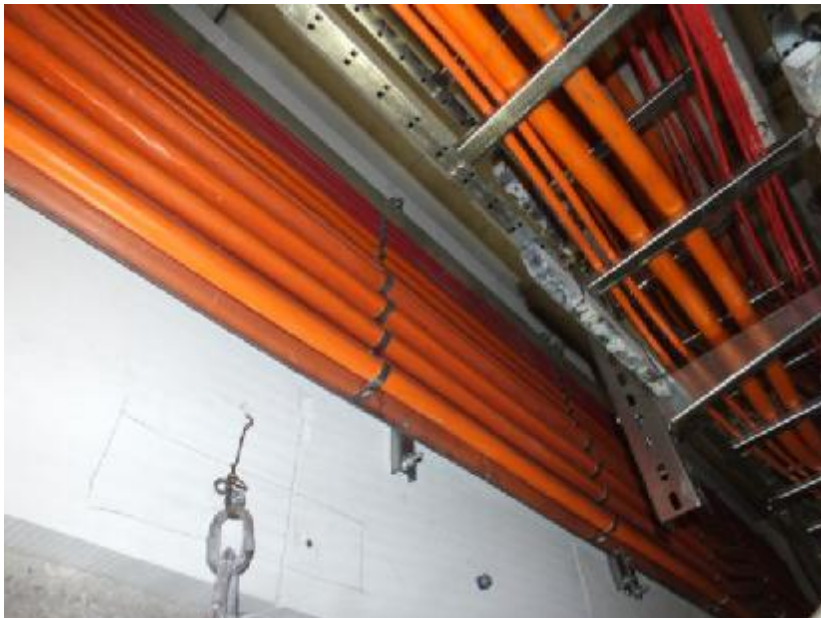


Photo taken before the test.



Photo taken before the test.



PHOTOS



Photo taken after the test.



Photo taken after the test.



Photo taken after the test.



PHOTOS



Photo taken after the test.



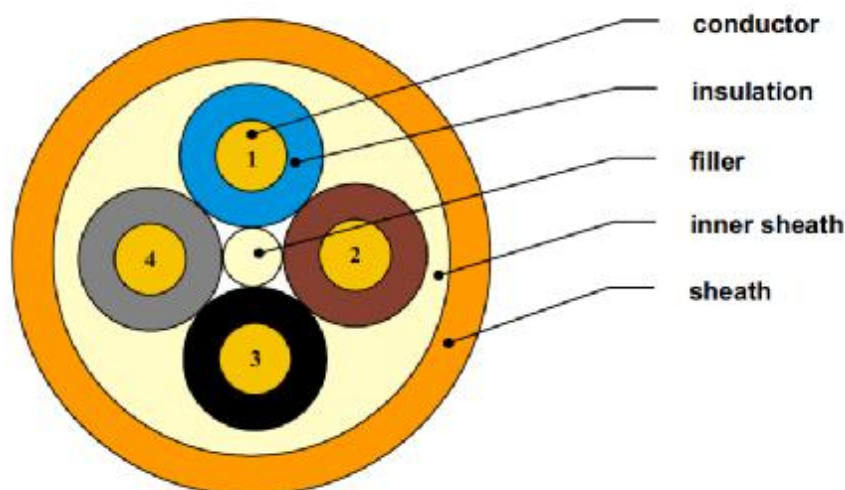
Photo taken after the test.



Photo taken after the test.



CABLES

(N)HXH FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295

insulation - cross-linked halogen free ceramic forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 + 5	1,5 + 300
7 + 10	1,5 + 10
10 + 48	1,5 + 2,5

Operating voltage

0,6/1kV

Voltage test

4000 V, 50 Hz

Insulation resistivity at 90°C,
minimum

10¹²

Operating temperature range
during operation
during installation

-30°C up to +90°C
-5°C up to +50°C

Minimum bending radius

15 x D single core
12 x D multi core
D = outer diameter

Cable combustibility

Fire resistance

Combustibility tests

Reference standards

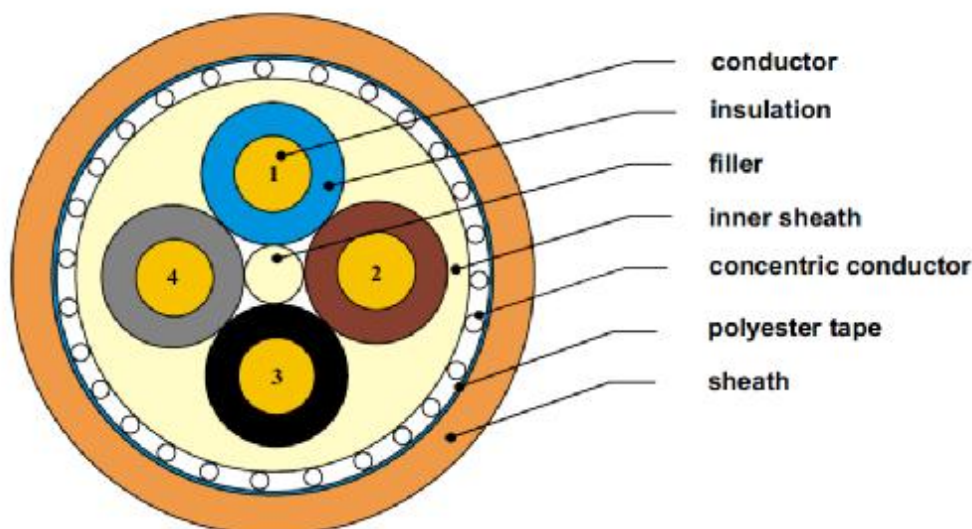
E90

PN-EN 50226:2006, IEC 60332-3

DIN VDE 0266



CABLES

(N)HXCH FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295

insulation - cross-linked halogen free ceramic forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

concentric conductor - formed by bare copper wires with counter copper tape

polyester tape

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 + 4	1,5/1,5 + 240/120
7	1,5/1,5 + 4/4
10 + 30	1,5/2,5 + 2,5/10

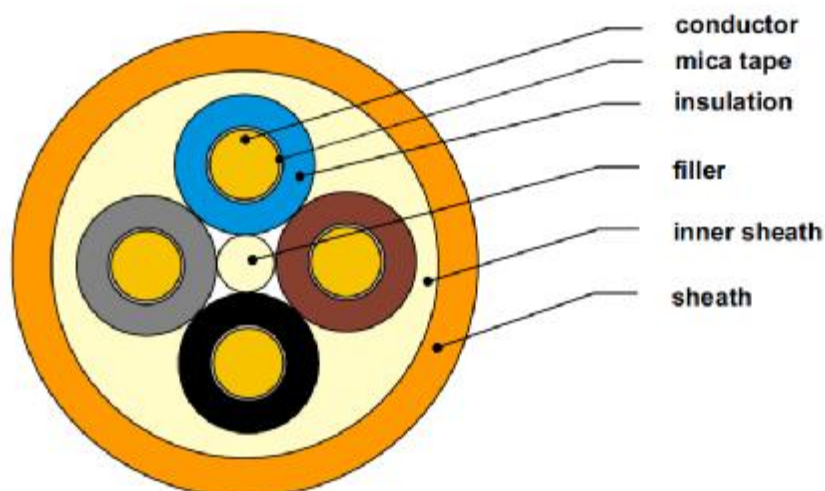
Operating voltage 0,6/1 kV
 Voltage test 4000 V, 50 Hz
 Insulation resistivity at 90°C, minimum 10^{12}

Operating temperature range during operation during installation -30°C up to +90°C
 -5°C up to +50°C
 Minimum bending radius
 15 x D single core
 12 x D multi core
 D = outer diameter

Cable combustibility
 Fire resistance E90
 Combustibility tests PN-EN 50226:2006, IEC 60332-3
 Reference standards DIN VDE 0266



CABLES

NHXX FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295

insulation - mica tape and cross-linked halogen free forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 + 5	1,5 + 300
7 + 10	1,5 + 10
10 + 48	1,5 + 2,5

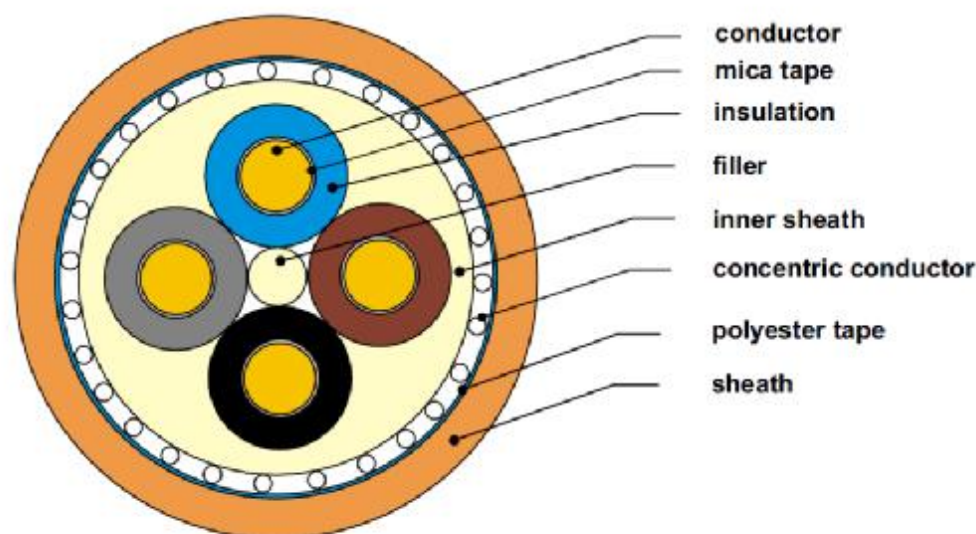
Operating voltage 0,6/1kV
 Voltage test 4000 V, 50 Hz
 Insulation resistivity at 90°C, minimum 10^{12}

Operating temperature range during operation during installation -30°C up to +90°C
 -5°C up to +50°C
 Minimum bending radius 15 x D single core
 12 x D multi core
 D = outer diameter

Cable combustibility
 Fire resistance E90
 Combustibility tests PN-EN 50226:2006, IEC 60332-3
 Reference standards DIN VDE 0266



CABLES

NHXCH FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to DIN VDE 0295

insulation - mica tape and cross-linked halogen free forming polymer compound acc. to DIN VDE 0266

filler - flame resistant, halogen free polymer compound

inner sheath - flame resistant, halogen free polymer compound

concentric conductor - formed by bare copper wires with counter copper tape

polyester tape

sheath - flame resistant, halogen free polymer compound acc. to DIN VDE 0276-604

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 + 4	1,5/1,5 + 240/120
7	1,5/1,5 + 4/4
10 + 30	1,5/2,5 + 2,5/10

Operating voltage

0,6/1 kV

Voltage test

4000 V, 50 Hz

Insulation resistivity at 90°C,
minimum

10¹²

Operating temperature range
during operation
during installation

-30°C up to +90°C
-5°C up to +50°C

Minimum bending radius

15 x D single core
12 x D multi core
D = outer diameter

Cable combustibility

Fire resistance

Combustibility tests

Reference standards

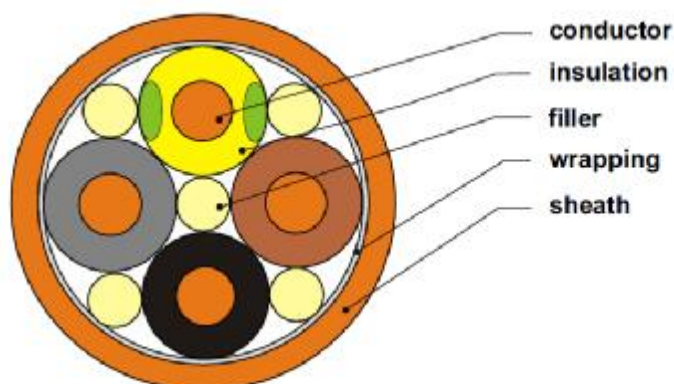
E90

PN-EN 50226:2006, IEC 60332-3

DIN VDE 0266



CABLES

BiTflame 1000 FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to EN 60228 or IEC 60228

insulation - mica tape and cross-linked halogen free forming polymer compound

filler - flame resistant, halogen free polymer compound (above 16mm²)

wrapping - glass-fibre tape

sheath - flame resistant, halogen free polymer compound

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 ÷ 5	1,5 ÷ 300
7 ÷ 10	1,5 ÷ 10
10 ÷ 48	1,5 ÷ 2,5

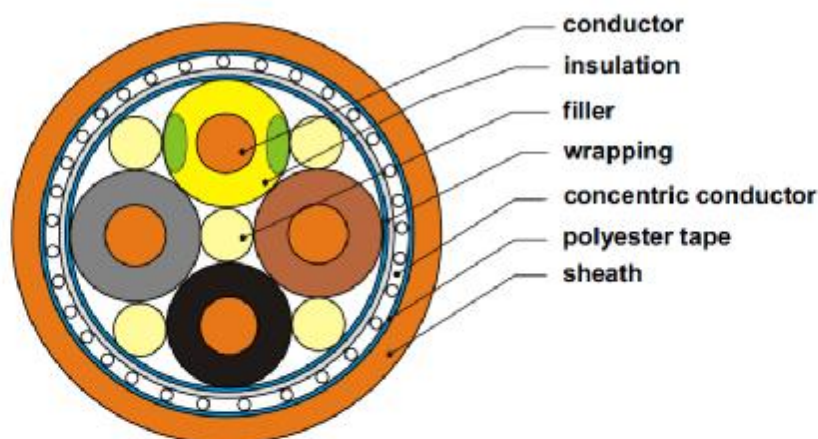
Operating voltage 0,6/1kV
 Voltage test 4000 V, 50 Hz
 Insulation resistivity at 90°C, minimum 10¹²

Operating temperature range during operation during installation -30°C up to +90°C
 -5°C up to +50°C
 Minimum bending radius 15 x D single core
 12 x D multi core
 D = outer diameter

Cable combustibility
 Fire resistance E90
 Combustibility tests PN-EN 50226:2006, IEC 60332-3
 Reference standards ZN-CB



CABLES

BiTflame 1000C FE180/E90**FIRE RESISTANT HALOGEN FREE POWER CABLES****APPLICATIONS**

Safety cables are used in all locations where a special protection against fire and fire damage is necessary for human life and equipment and where strict safety regulations have to be met and where large emergency running time is necessary. They may be used indoor and outdoor, but not directly in earth and water. They are considered as protectively insulated.

CONSTRUCTION

conductor - bare copper, solid or stranded acc. to EN 60228 or IEC 60228

insulation - mica tape and cross-linked halogen free forming polymer compound

filler - flame resistant, halogen free polymer compound

wrapping - polyester and glass-fibre tape

concentric conductor - formed by bare copper wires with counter copper tape

polyester tape

sheath - flame resistant, halogen free polymer compound

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
1 ÷ 4	1,5/1,5 ÷ 240/120
7	1,5/1,5 ÷ 4/4
10 ÷ 30	1,5/2,5 ÷ 2,5/10

Operating voltage 0,6/1 kV
 Voltage test 4000 V, 50 Hz
 Insulation resistivity at 90°C, minimum 10^{12}

Operating temperature range during operation during installation -30°C up to +90°C
 -5°C up to +50°C
 Minimum bending radius
 15 x D single core
 12 x D multi core
 D = outer diameter

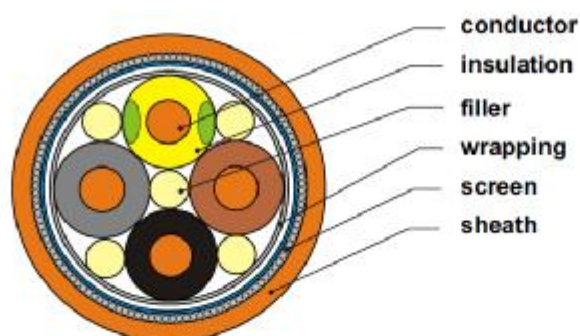
Cable combustibility
 Fire resistance E90
 Combustibility tests PN-EN 50226:2006, IEC 60332-3
 Reference standards ZN-CB



CABLES

BiTservo® FS FE180/E90

**FIRE RESISTANT, FLEXIBLE, HALOGEN-FREE MOTOR CONNECTION CABLES
FOR FREQUENCY CONVERTERS 0,6/1 kV**

**APPLICATIONS**

Cables with a special construction, used to supply power to motors from frequency converters while maintaining full electromagnetic compatibility. The special crosslinked and insulation ensures low cable capacitance in comparison with cables with a PVC insulation. The cables are suitable for both fixed installation and movable connections in industrial equipment, process lines, and machines operating in dry and damp rooms - also in public buildings. The entire cable is made of halogen-free materials, and does not emit noxious substances during a fire. The cable is unsuited for external installations and direct underground installation.

CONSTRUCTION

conductor - flexible copper wire, class 5 as per EN 60228 or IEC 60228

insulation - special crosslinked compound

filler - flame resistant, halogen-free polymer compound

wrapping - polyester and glass-fibre tape

screen - an electrostatic screen in the form of polyester tape covered with a layer of aluminium and a second screen in the form of tinned copper wire braid

sheath - flame resistant, halogen-free polymer compound

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
4	1,5 + 240

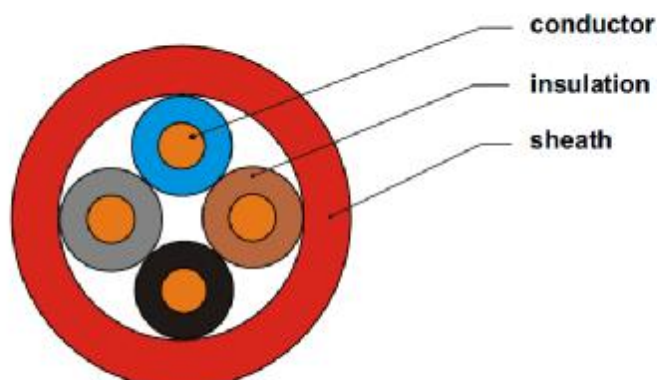
Operating voltage 0,6/1 kV
Voltage test 4000 V, 50 Hz
Insulation resistivity at 90°C,
minimum 10^{12}

Operating temperature range
during operation -30°C up to +80°C
during installation -10°C up to +50°C
Minimum bending radius
7,5 x D - D < 20mm
10 x D - D > 20mm
D = outer diameter

Cable combustibility
Fire resistance E90
Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3
Reference standards ZN-CB



CABLES

HDGs FE180/PH90/E90**FIRE RESISTANT HALOGEN FREE POWER AND CONTROL CABLE****APPLICATIONS**

Halogen-free fire resistant cables are designed for installation in places where it is necessary to ensure operation of devices under fire conditions. There are recommended for emergency lighting installations, smoke extraction systems, alarm systems, signalling systems, sound warning and control systems, fire alarm signaling and automation and other safety ensuring circuits.

CONSTRUCTION

conductor - bare copper, solid acc. to PN-EN 60228

insulation - cross-linked halogen free ceramic forming polymer compound

sheath - flame resistant, halogen free polymer compound

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
2 ÷ 5	1 ÷ 10
6 ÷ 37	1 ÷ 2,5

Operating voltage 300/500 V

Voltage test 2000 V, 50 Hz

core/core 2000 V, 50 Hz

core/screen 2000 V, 50 Hz

Insulation resistivity at 90°C,
minimum 10¹¹

Operating temperature range

during operation -30°C up to +80°C

during installation -10°C up to +50°C

Minimum bending radius 10 x D single core
D = outer diameter

Cable combustibility

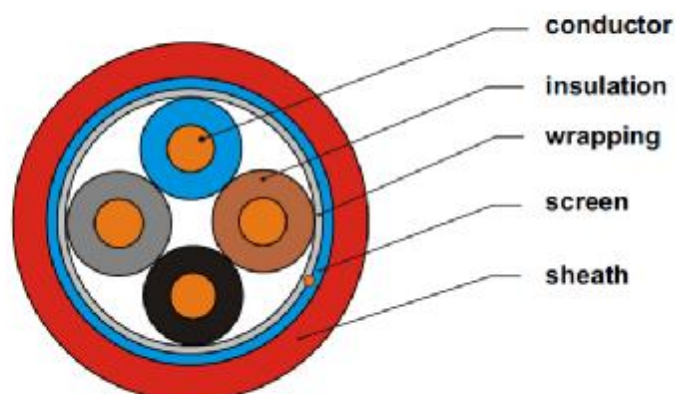
Fire resistance E90

Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3

Reference standards ZN-CB-03-2002



CABLES

HDGsekwf FE180/PH90/E90**FIRE RESISTANT HALOGEN FREE POWER AND CONTROL CABLE****APPLICATIONS**

Halogen-free fire resistant cables are designed for installation in places where it is necessary to ensure operation of devices under fire conditions. There are recommended for emergency lighting installations, smoke extraction systems, alarm systems, signalling systems, sound warning and control systems, fire alarm signaling and automation and other safety ensuring circuits.

CONSTRUCTION

conductor - bare copper, solid acc. to PN-EN 60228

insulation - cross-linked halogen free ceramic forming polymer compound

wrapping - polyester tape

screen - static screen of plastic coated metal foil with tinned copper drain wire

sheath - flame resistant, halogen free polymer compound

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor cross-section
n	mm ²
2 ÷ 5	1 ÷ 10
6 ÷ 37	1 ÷ 2,5

Operating voltage 300/500 V

Voltage test 2000 V, 50 Hz

core/core 2000 V, 50 Hz

core/screen 2000 V, 50 Hz

Insulation resistivity at 90°C, minimum 10¹¹

Operating temperature range during operation

-30°C up to +80°C

during installation

-10°C up to +50°C

Minimum bending radius

10 x D single core
D = outer diameter

Cable combustibility

Fire resistance

Combustibility tests

Reference standards

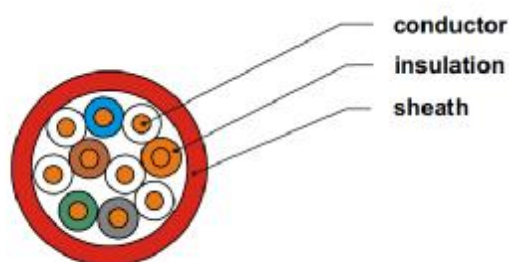
E90

PN-EN 50200, PN-EN 50226:2006
IEC 60332-3

ZN-CB-03-2002



CABLES

HTKSH FE180/PH90/E90**FIRE RESISTANT HALOGEN FREE ELECTRONIC AND TELECOMMUNICATIONS CABLE****APPLICATIONS**

Safety installations cables are used for the transmission signals and measuring data in control circuits, in locations where a particular protection against fire and fire damage for human life and equipment is necessary.
Installation cables are not admissible for power installation purposes and direct burial.

CONSTRUCTION

conductor - bare copper, solid acc. to PN-EN 60228

insulation - mica tape and halogen free forming polymer compound

sheath - flame resistant, halogen free polymer compound

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor diameter
n	mm
1 x 2 x 20 x 2 x	0,8
1 x 2 x 10 x 2 x	1,0
1 x 2 x 10 x 2 x	1,4
1 x 2 x 10 x 2 x	1,8
1 x 2 x 10 x 2 x	2,3
1 x 2 x 10 x 2 x	2,8

Operating voltage 225V
Voltage test 1500 V, 50 Hz
core/core

Insulation resistivity at 90°C,
minimum 10¹¹

Operating temperature range
during operation -30°C up to +80°C
during installation -5°C up to +50°C
Minimum bending radius 10 x D single core
D = outer diameter

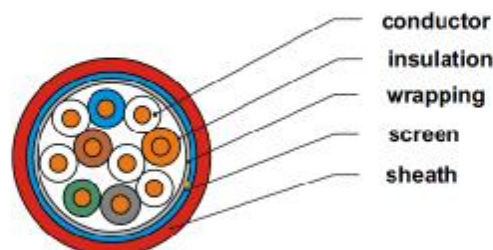
Cable combustibility
Fire resistance E90
Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3
Reference standards ZN-CB-25-2005



CABLES

HTKSHekw FE180/PH90/E90

FIRE RESISTANT HALOGEN FREE ELECTRONIC AND TELECOMMUNICATIONS CABLE



APPLICATIONS

Safety installations cables are used for the transmission signals and measuring data in control circuits, in locations where a particular protection against fire and fire damage for human life and equipment is necessary.

Installation cables are not admissible for power installation purposes and direct burial.

CONSTRUCTION

conductor - bare copper, solid acc. to PN-EN 60228

insulation - mica tape and halogen free forming polymer compound

wrapping - polyester tape

screen - static screen of plastic coated metal foil with a solid, tinned drain wire

sheath - flame resistant, halogen free polymer compound

CHARACTERISTICS

Conductor cross-section	
Number of conductors	Nominal conductor diameter
n	mm
1 x 2 x 20 x 2 x	0,8
1 x 2 x 10 x 2 x	1,0
1 x 2 x 10 x 2 x	1,4
1 x 2 x 10 x 2 x	1,8
1 x 2 x 10 x 2 x	2,3
1 x 2 x 10 x 2 x	2,8

Operating voltage 225V
Voltage test 1500 V, 50 Hz
core/core

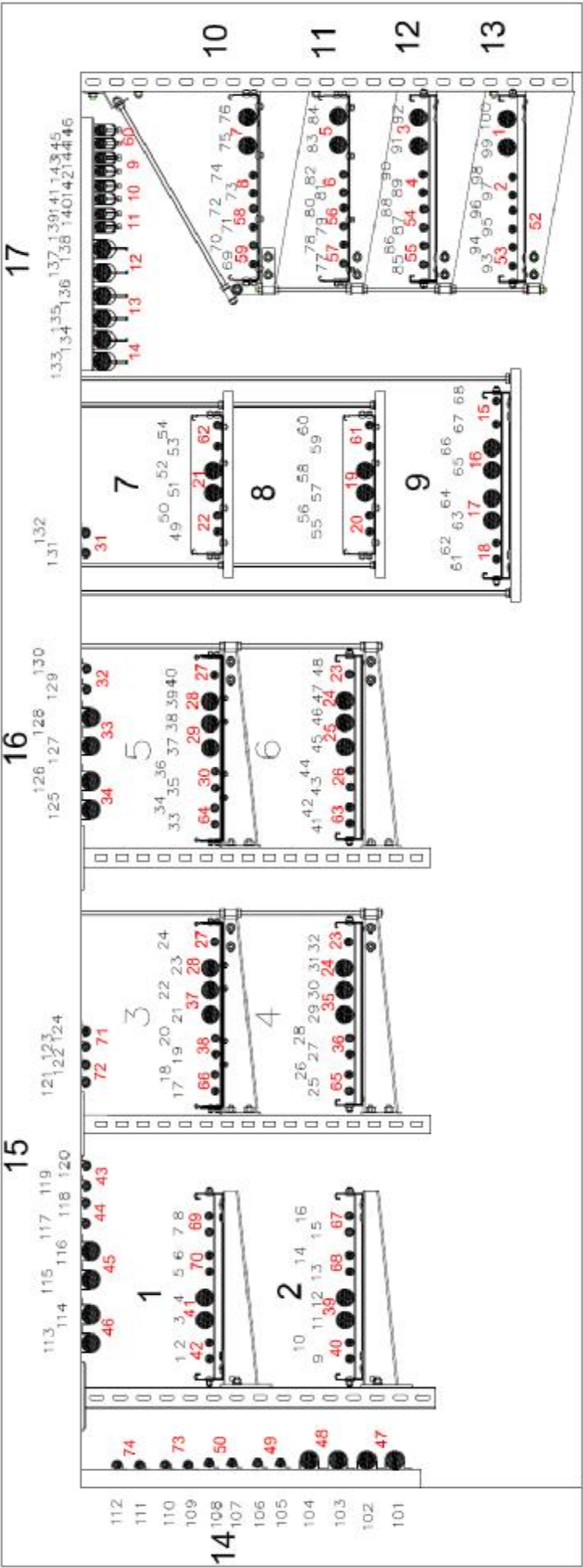
Insulation resistivity at 90°C,
minimum 10¹¹

Operating temperature range
during operation -30°C up to +80°C
during installation -5°C up to +50°C
Minimum bending radius 10 x D single core
D = outer diameter

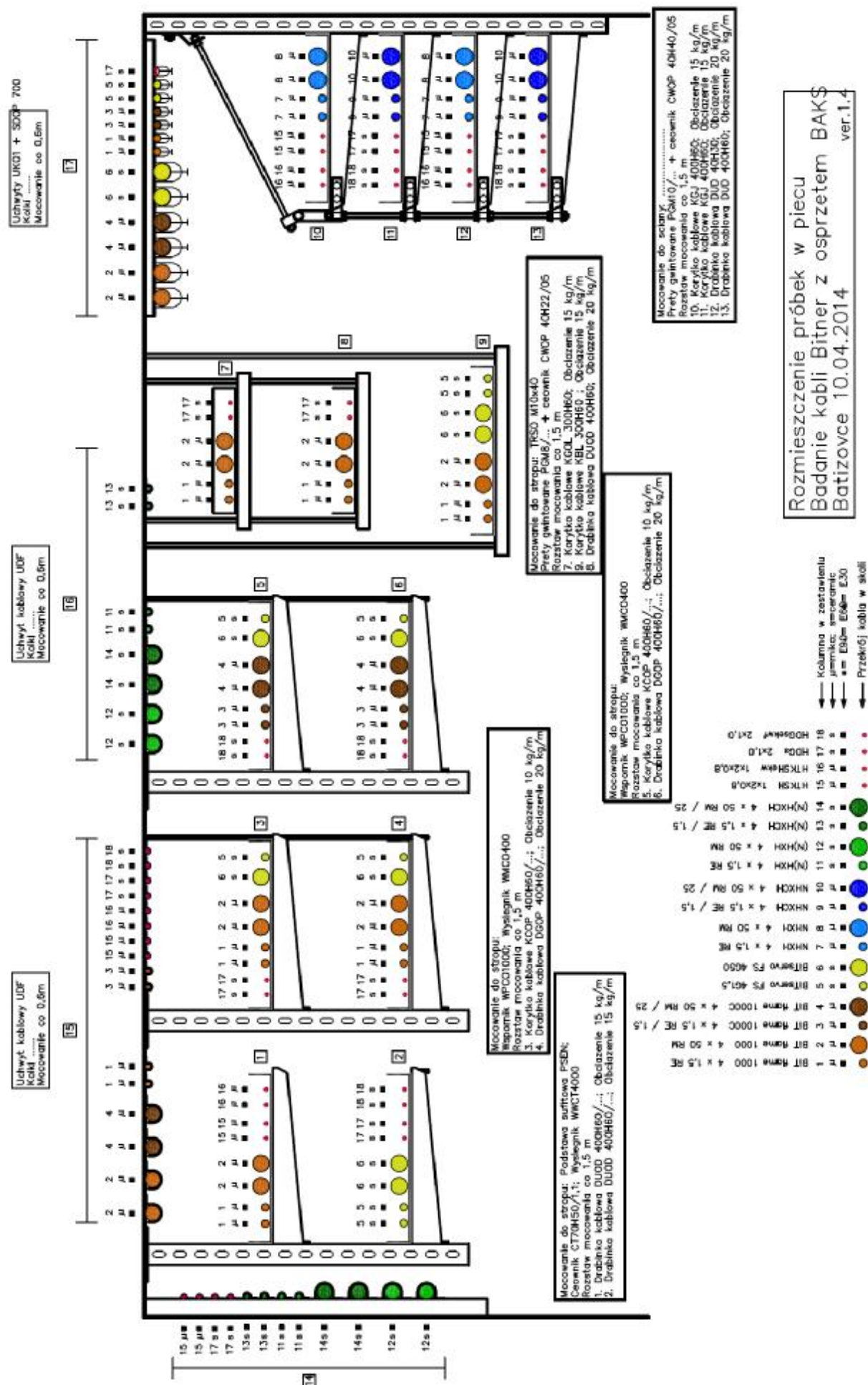
Cable combustibility E90
Fire resistance
Combustibility tests PN-EN 50200, PN-EN 50226:2006
IEC 60332-3
Reference standards ZN-CB-25-2005



BAKS - BITNER FIRES 10.04.2014



DRAWINGS





DRAWINGS

No	No Fires	Type of cable	Position	Description of construction, fixing, loading
1	42	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV	1	Cable ladder DUD/DUOD 400H 60/B-400, thickness of steel sheet 1,2 mm 1.5m / 15kg/m Construction: Ceiling suspension PSEN, assembling profile CT70H50, bracket WWCT400, Fixing to ceiling by expansion anchors R-HPTII-ZF-10080/20
2		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
3	41	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
4		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
5	70	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
6		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
7	69	HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V		
8		HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V		
9	40	BITservo® FS 4G1,5 FE180/E90 0,6/1kV	2	Cable ladder DUD/DUOD 400H 60/B-400, thickness of steel sheet 1,2 mm 1.5m / 15kg/m Construction: Ceiling suspension PSEN, assembling profile CT70H50, bracket WWCT400, Fixing to ceiling by expansion anchors R-HPTII-ZF-10080/20
10		BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
11	39	BITservo® FS 4G50 FE180/E90 0,6/1kV		
12		BITservo® FS 4G50 FE180/E90 0,6/1kV		
13	68	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
14		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
15	67	HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
16		HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
17	66	HDGs 2x1,0 FE180/PH/90/E90 300/500V	3	Cable tray KCP/KCOP 400H60/B-400, thickness of steel sheet 1,5 mm 1.5m / 10kg/m Construction: Consoles WPCW/WPCO1000 Brackets WMC/WMCO400, threaded rods PG M10 Fixing to ceiling by expansion anchors R-HPTII-ZF-10080/20 and R-DCA-10-40
18		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
19	38	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
20		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
21	37	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
22		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
23	28	BITservo® FS 4G50 FE180/E90 0,6/1kV		
24	27	BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
25	65	HDGs 2x1,0 FE180/PH/90/E90 300/500V	4	Cable ladder DGOP 400H 60/B-400, thickness of steel sheet 1,5 mm 1.5m / 20kg/m Construction: Consoles WPCW/WPCO1000 Brackets WMC/WMCO400, threaded rods PG M10 Fixing to ceiling by expansion anchors R-HPTII-ZF-10080/20 and R-DCA-10-40
26		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
27	36	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
28		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
29	35	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
30		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
31	24	BITservo® FS 4G50 FE180/E90 0,6/1kV		
32	23	BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
33	64	HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	5	Cable tray KCP/KCOP 400H 60/B-400, thickness of steel sheet 1,5 mm 1.5m / 10kg/m / Construction: Consoles WPCW/WPCO1000 Brackets WMC/WMCO400, threaded rods PG M10 Fixing to ceiling by expansion anchors R-HPTII-ZF-10080/20 and R-DCA-10-40
34		HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
35	30	BIT flame 1000 C 4x1,5RE FE180/E90 0,6/1kV		
36		BIT flame 1000 C 4x1,5RE FE180/E90 0,6/1kV		
37	29	BIT flame 1000 C 4x50RM FE180/E90 0,6/1kV		
38		BIT flame 1000 C 4x50RM FE180/E90 0,6/1kV		
39	28	BITservo® FS 4G50 FE180/E90 0,6/1kV		
40	27	BITservo® FS 4G1,5 FE180/E90 0,6/1kV		



DRAWINGS

No	No Fires	Type of cable	Position	Description of construction, fixing, loading
41	63	HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	6	Cable ladder DGOP 400H 60/B-400, thickness of steel sheet 1,5 mm 1.5m / 20kg/m Construction: Consoles WPCW/WPCO1000 Brackets WMC/WMCO400, threaded rods PG M10 Fixing to ceiling by expansion anchors R-HPTII-ZF-10080/20 and R-DCA-10-40
42		HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
43	26	BIT flame 1000 C 4x1,5RE FE180/E90 0,6/1kV		
44		BIT flame 1000 C 4x1,5RE FE180/E90 0,6/1kV		
45	25	BIT flame 1000 C 4x50RM FE180/E90 0,6/1kV		
46		BIT flame 1000 C 4x50RM FE180/E90 0,6/1kV		
47	24	BITservo® FS 4G50 FE180/E90 0,6/1kV		
48	23	BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
49	22	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV	7	Cable tray KGL/KGOL 300H60/B-300 + cover, thickness of steel sheet 0,7 mm 1.5 m /15kg/m Construction: Assembling profile CWP/CWOP40H22/04, threaded rods PGM8/1, Fixing to ceiling by expansion anchors R-DCA-08-30
50		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
51	21	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
52		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
53	62	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
54		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
55	20	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV	8	Cable tray KBL KBOL 300H60/B-300 + cover, thickness of steel sheet 0,7 mm 1.5 m /15kg/m Construction: Assembling profile CWP/CWOP40H22/04, threaded rods PGM8/1, Fixing to ceiling by expansion anchors R-DCA-08-30
56		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
57	19	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
58		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
59	61	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
60		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
61	18	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV	9	Cable ladder DUOD 400H 60/B-400/ thickness of steel sheet 1,2 mm 1.5 m / 25kg/m Construction: Assembling profile CWP/CWOP40H22/05, threaded rods PGM10/1, Fixing to ceiling by expansion anchors R-DCA-10-40
62		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
63	17	BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
64		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
65	16	BITservo® FS 4G50 FE180/E90 0,6/1kV		
66		BITservo® FS 4G50 FE180/E90 0,6/1kV		
67	15	BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
68		BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
69	59	HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V	10	Cable tray KGJ/KGOJ 400H 60B-400 thickness of steel sheet 0,9 mm 1.5 m / 15kg/m Construction: Consoles CWP/CWOP40H40/1, brackets WMC /WMCO 400 threaded rods PG M10
70		HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V		
71	58	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
72		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
73	8	NHXX 4x1,5RE FE180/E90 0,6/1kV		
74		NHXX 4x1,5RE FE180/E90 0,6/1kV		
75	7	NHXX 4x50RM FE180/E90 0,6/1kV		
76		NHXX 4x50RM FE180/E90 0,6/1kV		



DRAWINGS

No	No Fires	Type of cable	Position	Description of construction, fixing, loading
77	57	HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	11	Cable tray KGJ/KGOJ 400H 60/B-400 thickness of steel sheet 0,9 mm 1.5 m / 15kg/m Construction: Consoles CWP/CWOP40H40/1, brackets WMC /WMCO 400 threaded rods PG M10
78		HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
79	56	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
80		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
81	6	NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
82		NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
83	5	NHXCH 4x50RM/25 FE180/E90 0,6/1kV		
84		NHXCH 4x50RM/25 FE180/E90 0,6/1kV		
85	55	HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V	12	Cable ladder DUD/DUOD 400H60/B-400 thickness of steel sheet 1,2 mm 1.5 m / 20kg/m Mocowanie: Construction: Consoles CWP/CWOP40H40/1, brackets WMC /WMCO 400 threaded rods PG M10
86		HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V		
87	54	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
88		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
89	4	NHXH 4x1,5RE FE180/E90 0,6/1kV		
90		NHXH 4x1,5RE FE180/E90 0,6/1kV		
91	3	NHXH 4x50RM FE180/E90 0,6/1kV		
92		NHXH 4x50RM FE180/E90 0,6/1kV		
93	53	HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	13	Cable ladder DUD/DUOD 400H60/B-400 thickness of steel sheet 1,2 mm 1.5 m / 20kg/m Construction: Consoles CWP/CWOP40H40/1, brackets WMC /WMCO 400 threaded rods PG M10
94		HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		
95	52	HDGs 2x1,0 FE180/PH/90/E90 300/500V		
96		HDGs 2x1,0 FE180/PH/90/E90 300/500V		
97	2	NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
98		NHXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
99	1	NHXCH 4x50RM/25 FE180/E90 0,6/1kV		
100		NHXCH 4x50RM/25 FE180/E90 0,6/1kV		
101	47	(N)HXH 4x50RM FE180/E90 0,6/1kV	14	Single cable clips UDF fixed in spacing of 600mm to steel sheet 0,7mm thick by screws OC-48016. Steel sheet fixed on wall.
102		(N)HXH 4x50RM FE180/E90 0,6/1kV		
103	48	(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
104		(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
105	49	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
106		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
107	50	(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
108		(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
109	73	HDGs 2x1,0 FE180/PH90/E90 300/500V		
110		HDGs 2x1,0 FE180/PH90/E90 300/500V		
111	74	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
112		HTKSH 1x2x0,8 FE180/PH90/E90 225V		

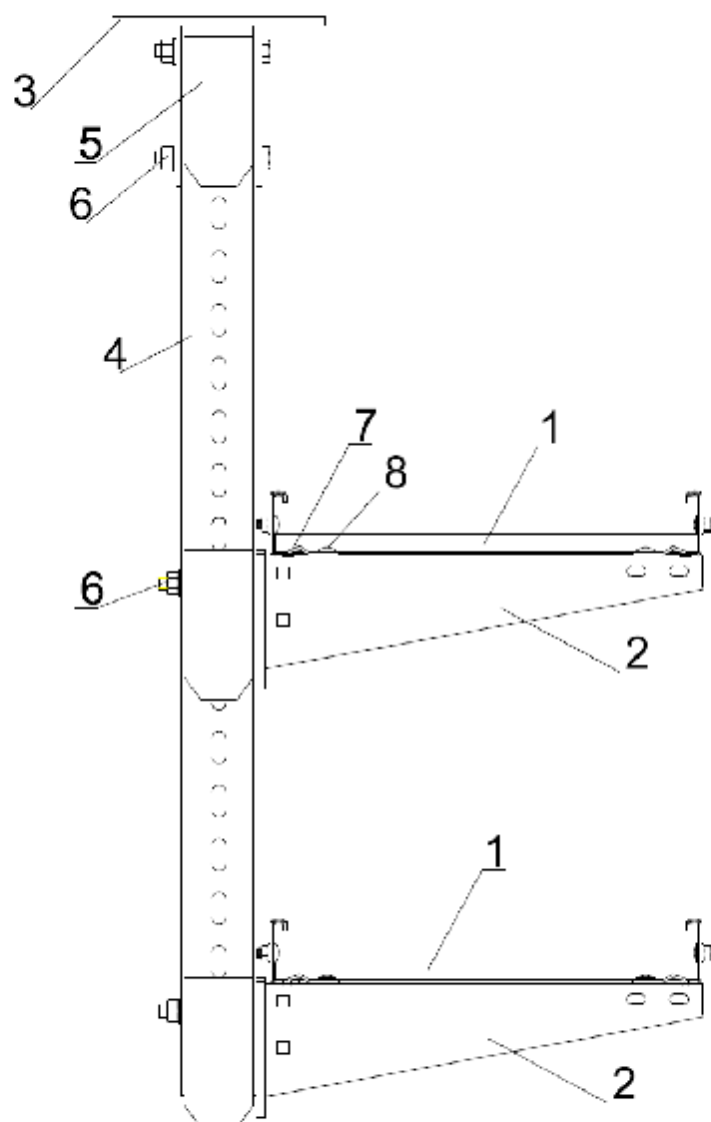


DRAWINGS

No	No Fires	Type of cable	Position	Description of construction, fixing, loading
113	46	BIT flame 1000 4x50RM FE180/E90 0,6/1kV	15	Single cable clips UDF fixed in spacing of 600mm to ceiling by anchors GS-06040.
114		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
115	45	BIT flame 1000 C 4x50RM FE180/E90 0,6/1kV		
116		BIT flame 1000 C 4x50RM FE180/E90 0,6/1kV		
117	44	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
118		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
119	43	BIT flame 1000 C 4x1,5RE FE180/E90 0,6/1kV		
120		BIT flame 1000 C 4x1,5RE FE180/E90 0,6/1kV		
121	72	HTKSH 1x2x0,8 FE180/PH90/E90 225V		
122		HTKSH 1x2x0,8 FE180/PH90/E90 225V		
122	71	HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V		
124		HTKSHekwf 1x2x0,8 FE180/PH90/E90 225V		
125	34	(N)HXH 4x50RM FE180/E90 0,6/1kV	16	Single cable clips UDF fixed in spacing of 600mm to ceiling by screws WHO-75052.
126		(N)HXH 4x50RM FE180/E90 0,6/1kV		
127	33	(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
128		(N)HXCH 4x50RM/25 FE180/E90 0,6/1kV		
129	32	(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
130		(N)HXH 4x1,5RE FE180/E90 0,6/1kV		
131	31	(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
132		(N)HXCH 4x1,5RE/1,5 FE180/E90 0,6/1kV		
133	14	BIT flame 1000 4x50RM FE180/E90 0,6/1kV	17	Cable clamps UK1/UKO1 fixed in spacing of 600 mm to assembling profiles SDOP700. Profiles fixed to ceiling by expansion anchors R-HPTII-ZF-08100/35.
134		BIT flame 1000 4x50RM FE180/E90 0,6/1kV		
135	13	BIT flame 1000 C 4x50RM FE180/E90 0,6/1kV		
136		BIT flame 1000 C 4x50RM FE180/E90 0,6/1kV		
137	12	BITservo® FS 4G50 FE180/E90 0,6/1kV		
138		BITservo® FS 4G50 FE180/E90 0,6/1kV		
139	11	BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
140		BIT flame 1000 4x1,5RE FE180/E90 0,6/1kV		
141	10	BIT flame 1000 C 4x1,5RE FE180/E90 0,6/1kV		
142		BIT flame 1000 C 4x1,5RE FE180/E90 0,6/1kV		
143	9	BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
144		BITservo® FS 4G1,5 FE180/E90 0,6/1kV		
145	60	HDGs 2x1,0 FE180/PH90/E90 300/500V		
146		HDGs 2x1,0 FE180/PH90/E90 300/500V		



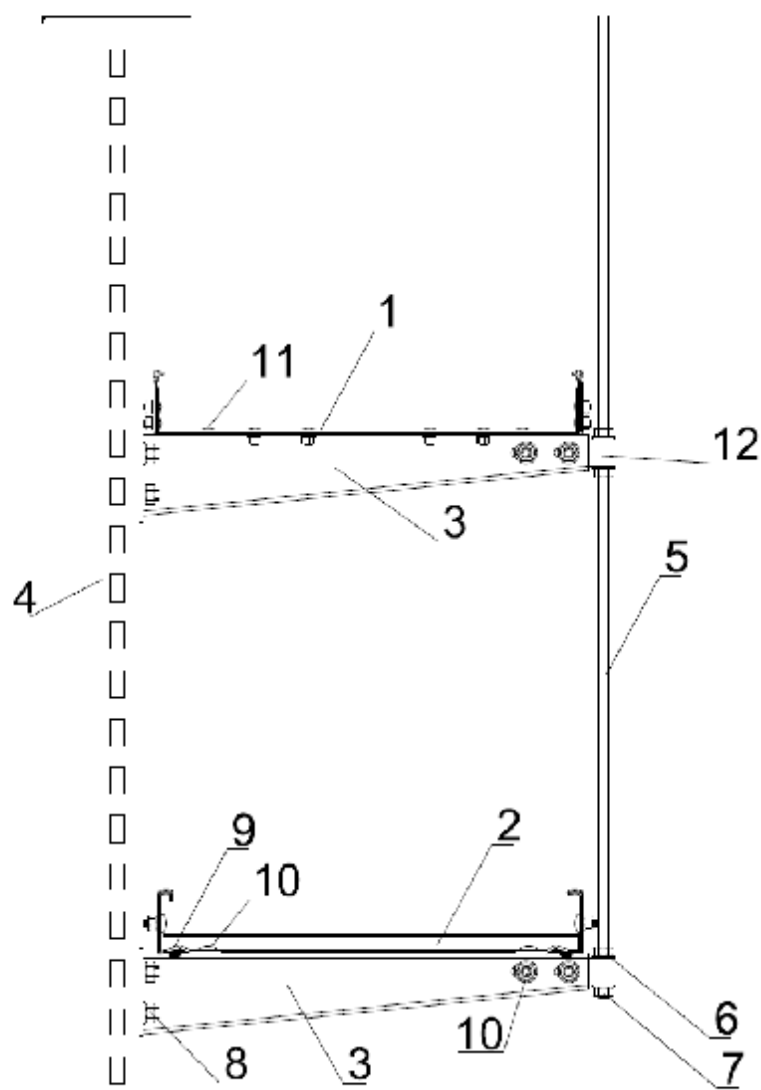
DRAWINGS



8	Śruba z łbem grzybkowy	SGKM8x14	4
7	Zacisk mocujący	ZM/ZMO	4
6	Śruba	SM M12x100	4
5	Blacha rozporowa	BR70	3
4	Ceownik	CT70H50/...	1
3	Podstawa sufitowa	PSEN	1
2	Wysięgnik	WWCT400	2
1	Drabina	DUD/DUOD400H60	2
L.p.	Nazwa	Symbol	Szt.



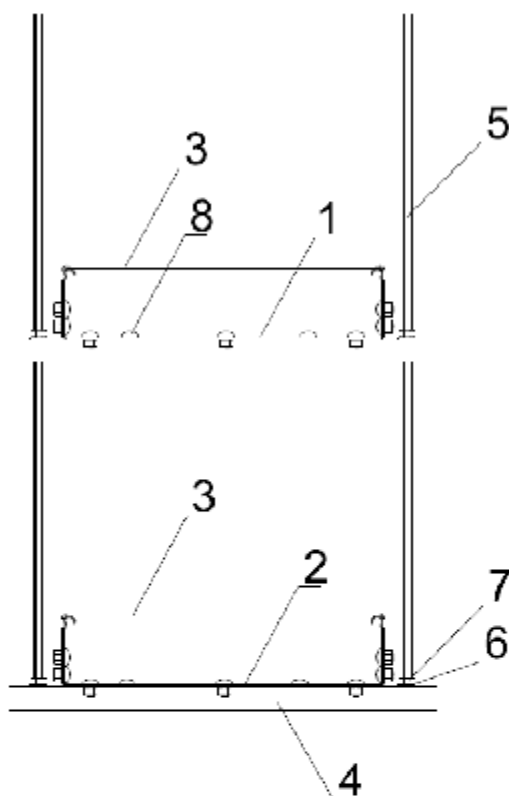
DRAWINGS



12	Uchwyt	UPW	2
11	Śruba z łbem grzybkowym	SGKM6x12	2
10	Śruba z łbem grzybkowym	SGKM8x14	6
9	Zacisk mocujący	ZM/ZMO	2
8	Śruba	SM M10x30	4
7	Nakrętka	NSM10	4
6	Podkładka	PP10	4
5	Pręt gwintowany	PGM10/...	1
4	Wspornik sufitowy	WPCW/WPCE1000	1
3	Wysięgnik	WMC/WMCO400	2
2	Drabina	DGOP400H60	1
1	Koryto	KCP/KCOP400H60	1
L.p.	Nazwa	Symbol	Szt.



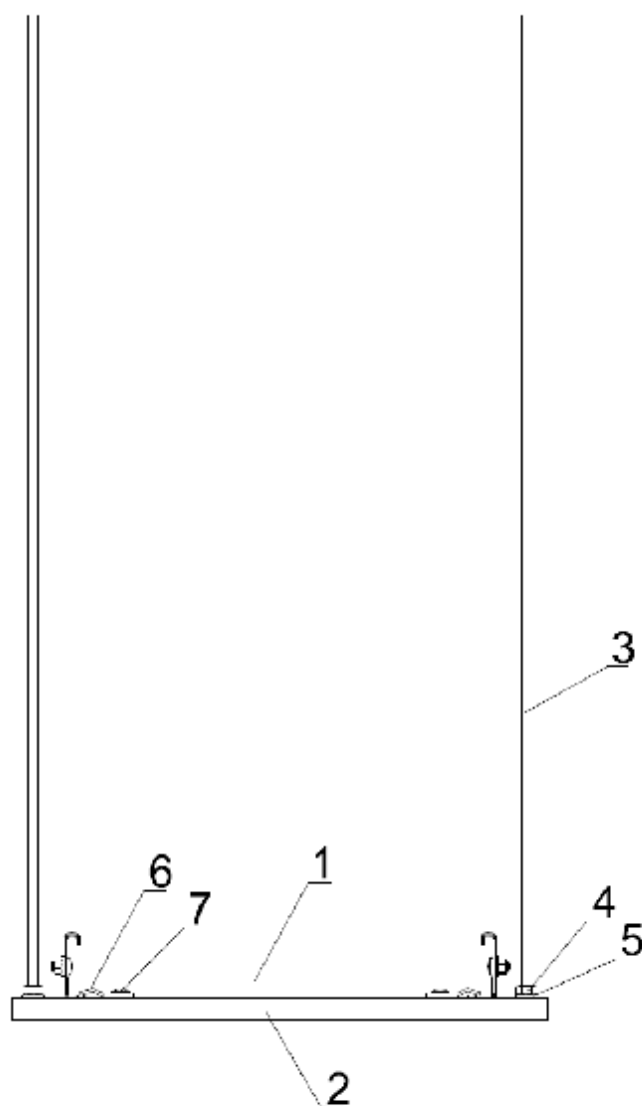
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8	Śruba z łbem grzybkowym	SGKM6x12	4
7	Nakrętka	NSM8	8
6	Podkładka	PP8	8
5	Pręt gwintowany	PGM8/...	2
4	Ceownik	CWD40H22/0,4	2
3	Pokrywa	PKL300	2
2	Koryto	KBL/KBOL300H60	1
1	Koryto	KGL/KGOL300H60	1
L.p.	Nazwa	Symbol	Szt.



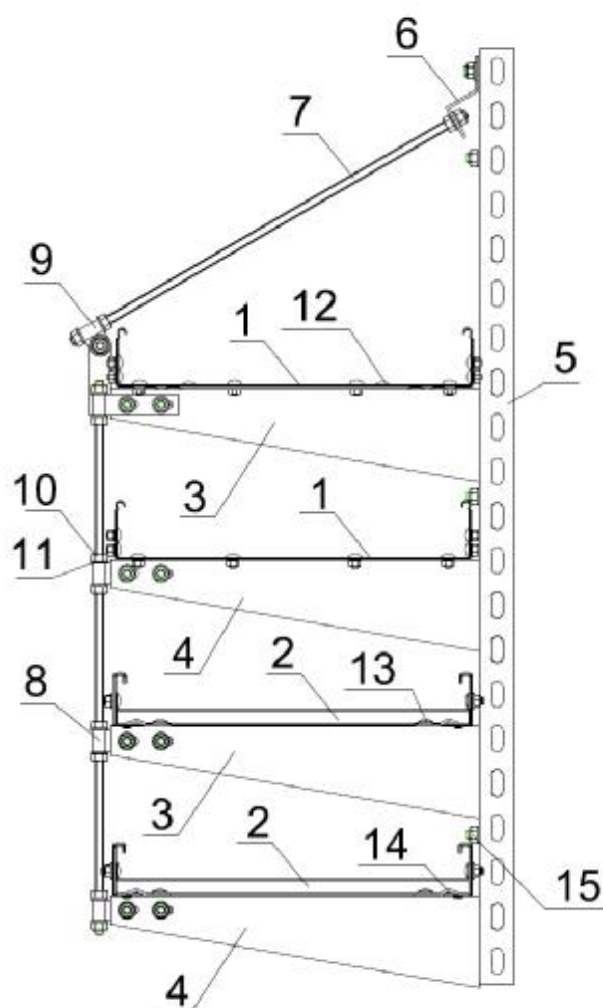
DRAWINGS



7	Śruba z łbem grzybkowym	SGKM8x14	2
6	Zacisk mocujący	ZM/ZMO	2
5	Podkładka	PP10	4
4	Nakrętka	NSM10	4
3	Pręt gwintowany	PGM10/...	2
2	Ceownik	CWD40H22/0,5	1
1	Drabina	DUD/DUOD400H60	1
L.p.	Nazwa	Symbol	Szt.



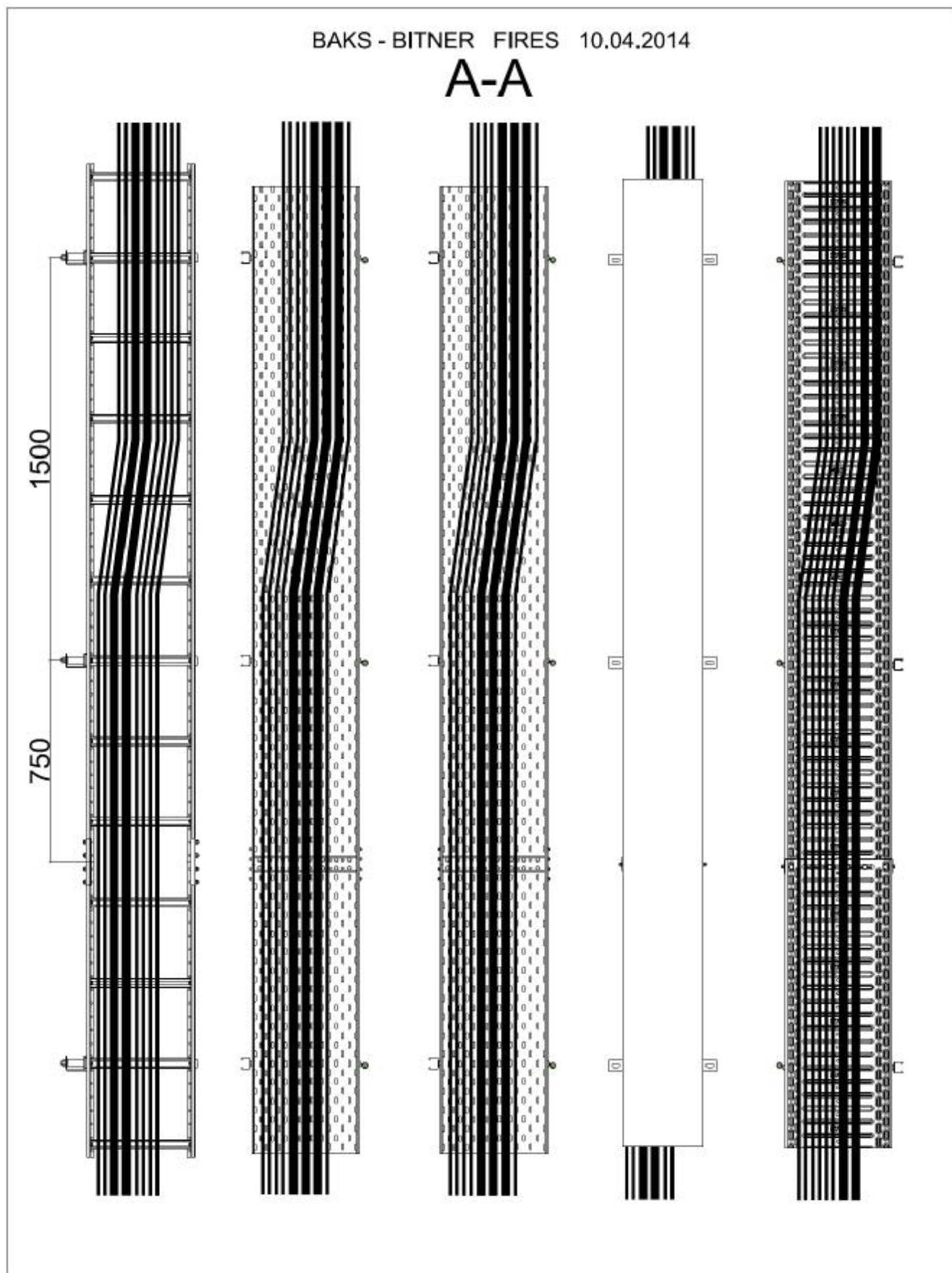
DRAWINGS



15	Śruba	SMM10X30	10
14	Zacisk mocujący	ZM/ZMO	4
13	Śruba z łbem grzybkowym	SGNM8x14	12
12	Śruba z łbem grzybkowym	SGNM6x12	4
11	Podkładka	PP10	12
10	Nakrętka	NSM10	12
9	Uchwyt	UPWK	1
8	Uchwyt	UPW	4
7	Pręt gwintowany	PGM10/...	2
6	Wieszak kątowy pręta	WKPO	1
5	Ceownik wzmacniony	CWP/CWOP40H40/1	1
4	Wysięgnik	WWS/WWSO400	2
3	Wysięgnik	WMC/WMCO400	2
2	Drabinka	DUD/DUOD400H60/3	2
1	Koryto	KGJ/KGOJ400H60/3	2
L.p.	Nazwa	Symbol	Szt.



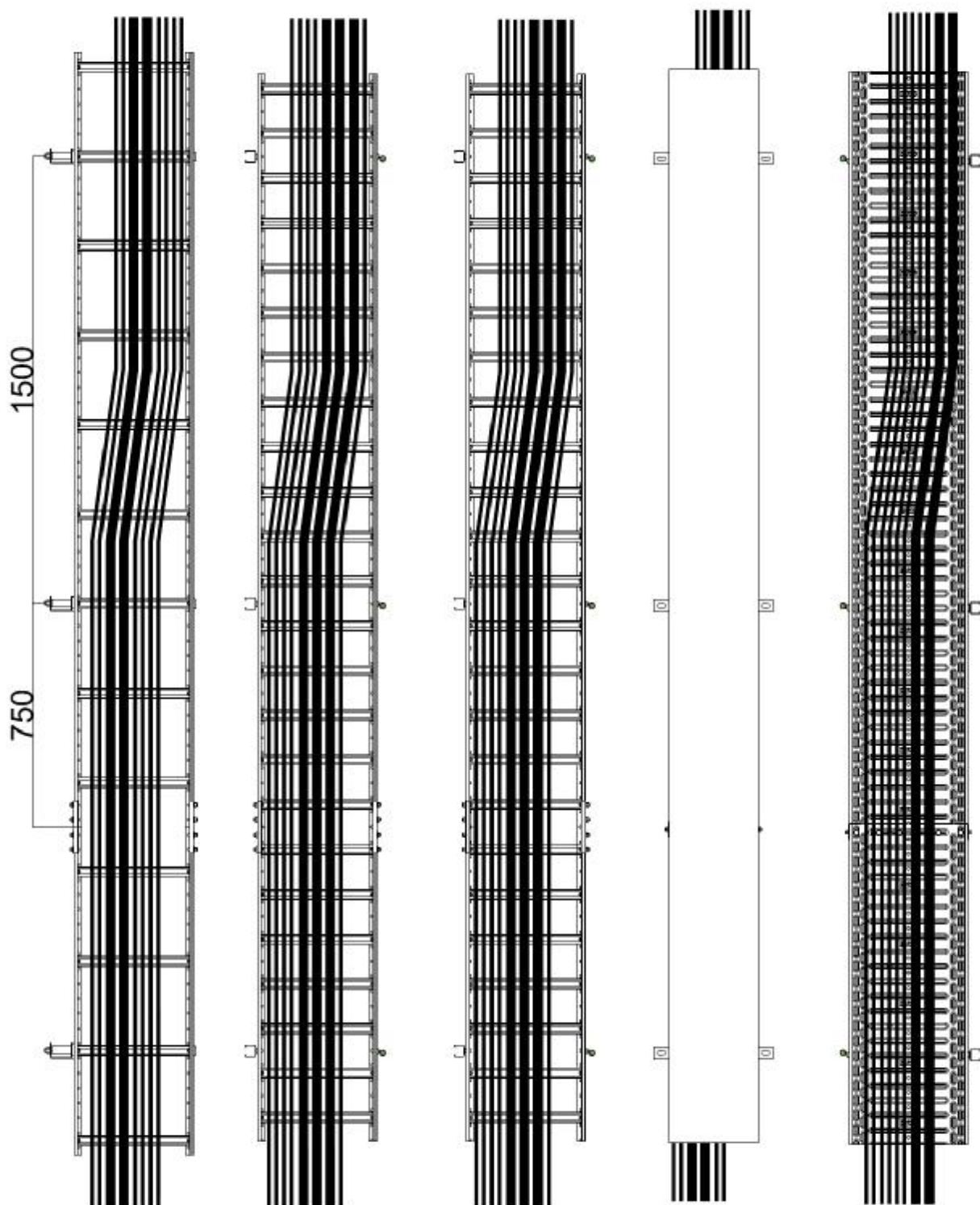
DRAWINGS





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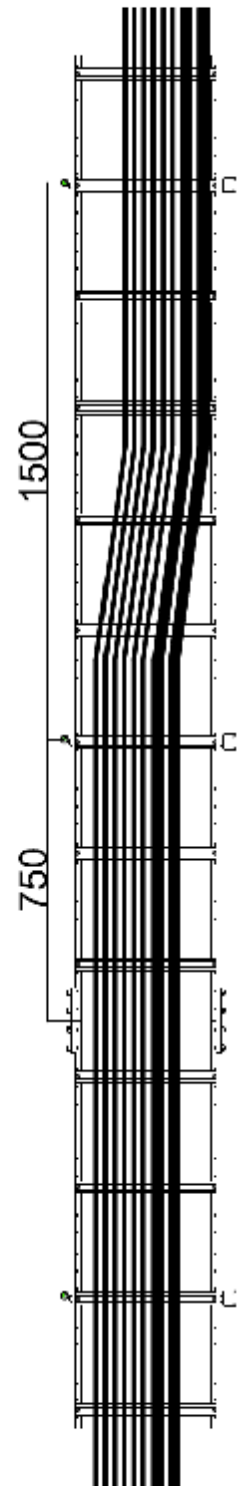
B-B





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C-C

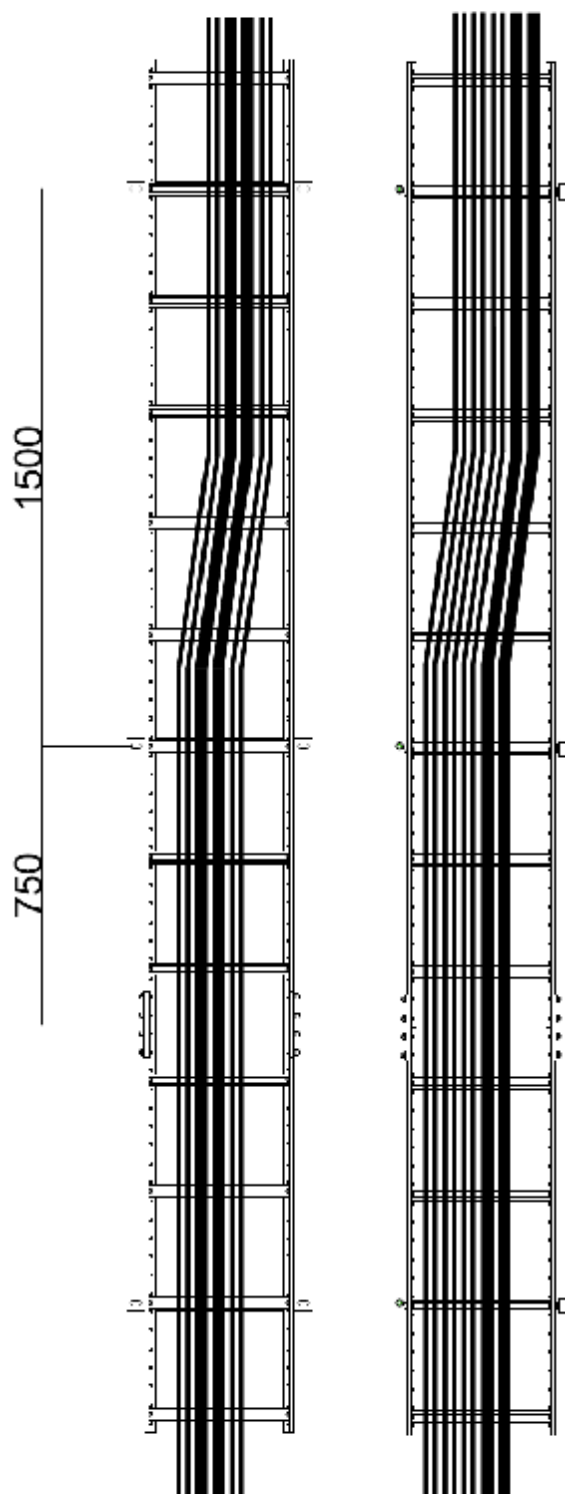




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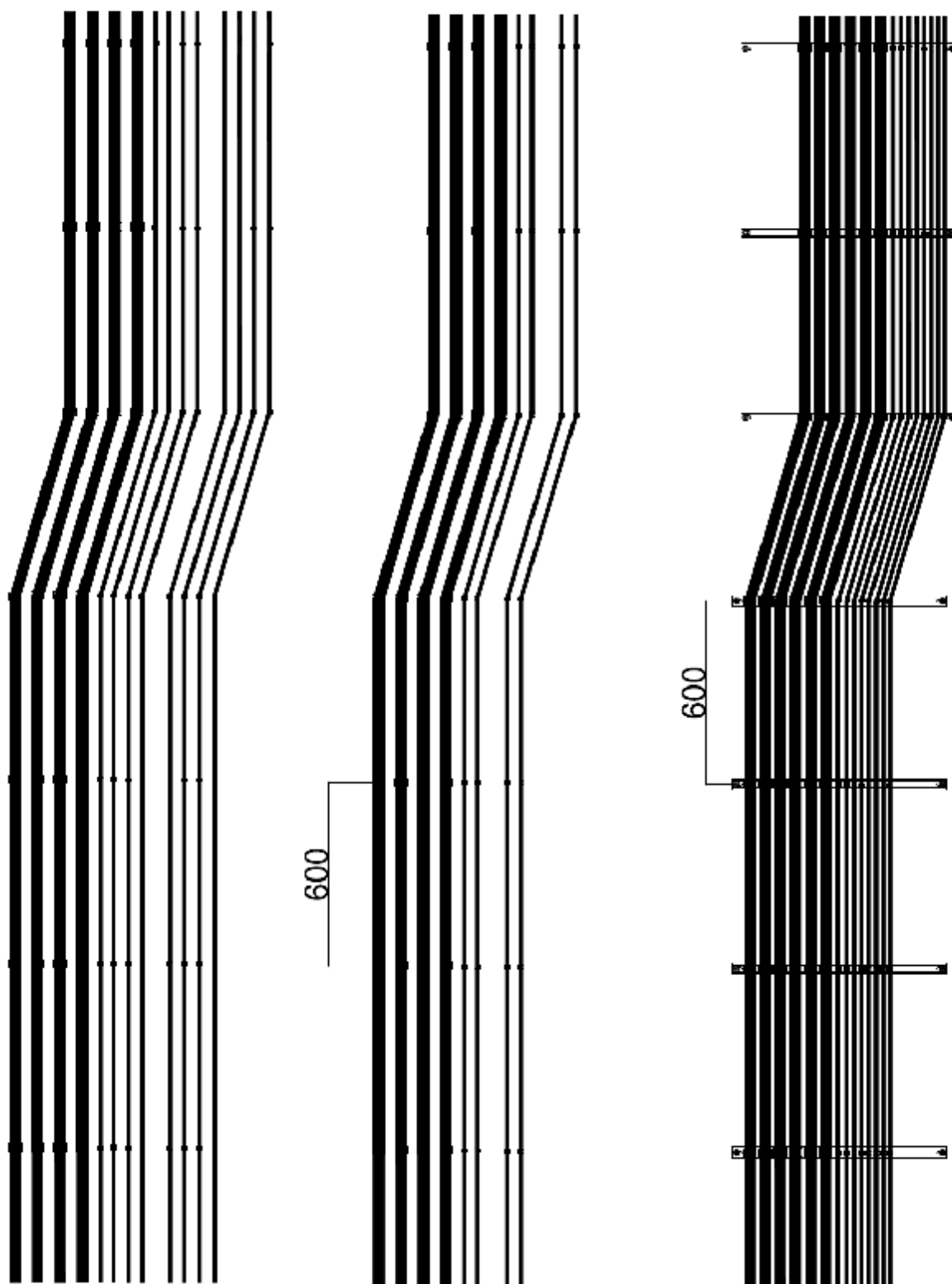
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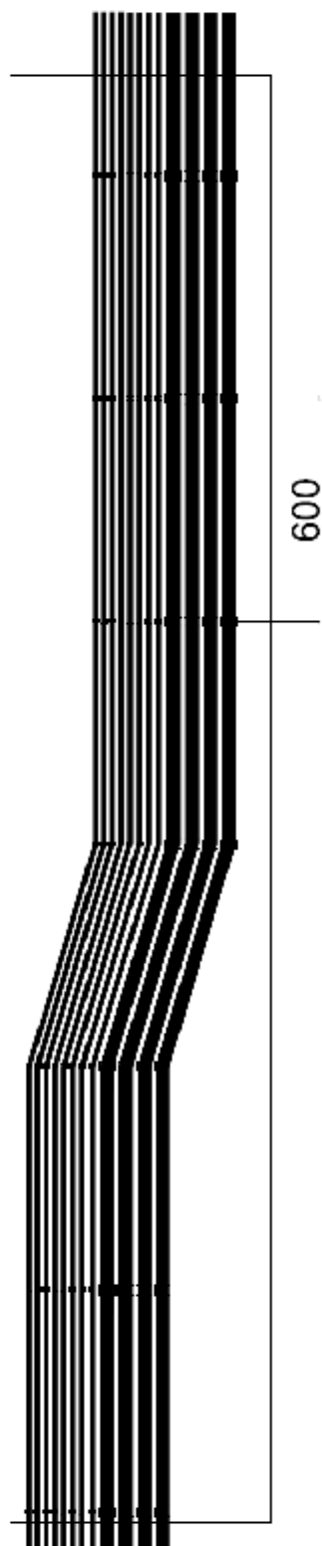
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F-F

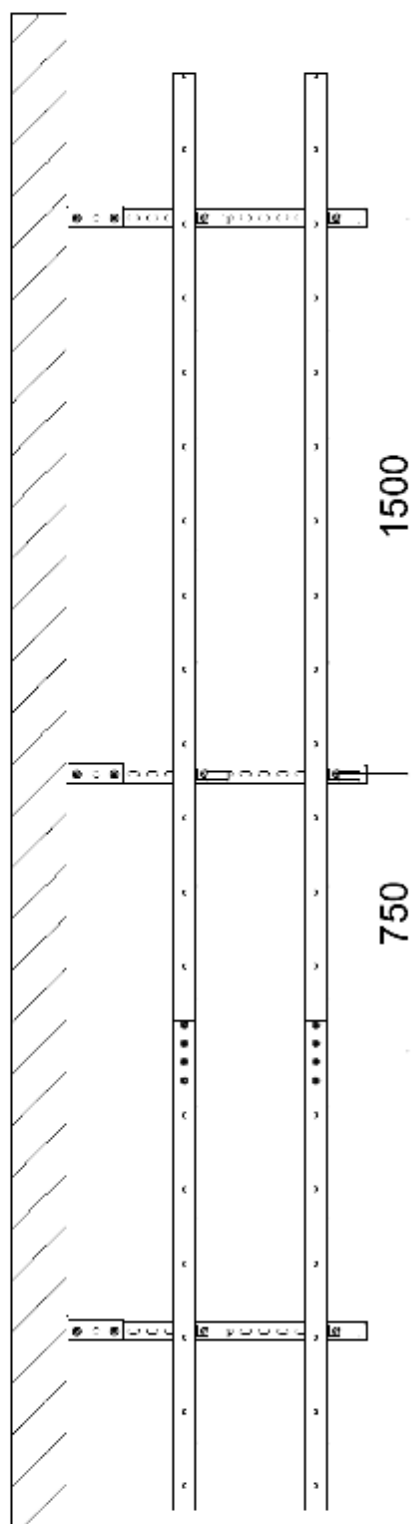




DRAWINGS

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G-G

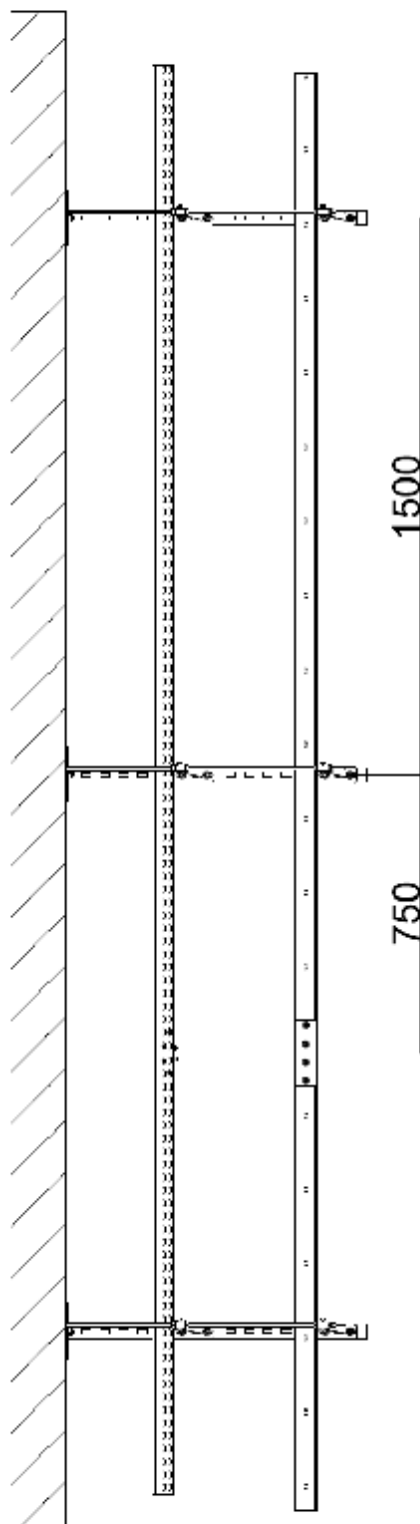




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H-H

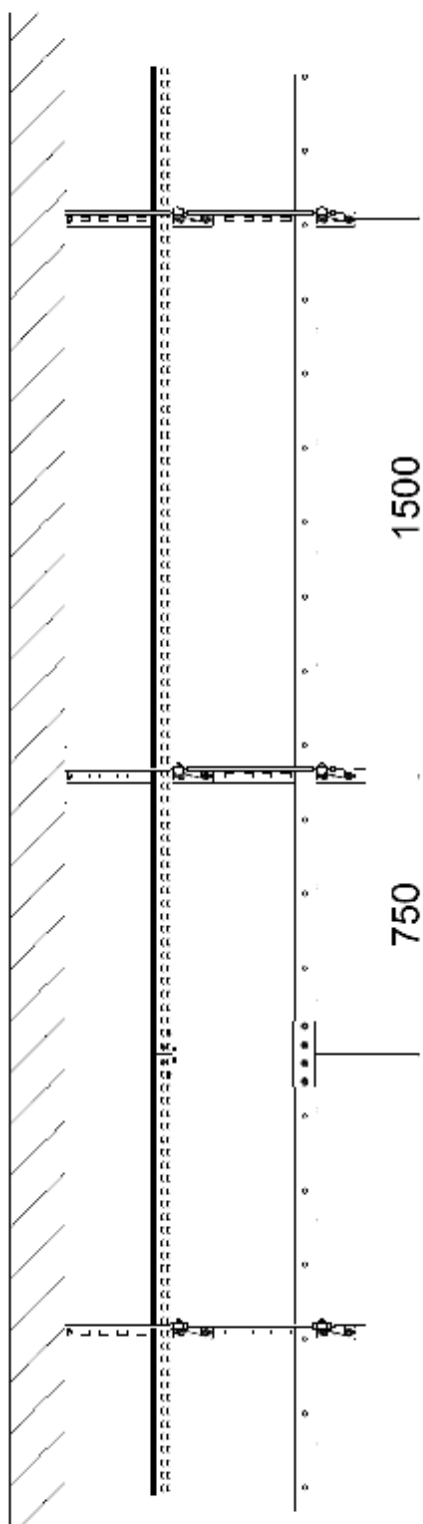




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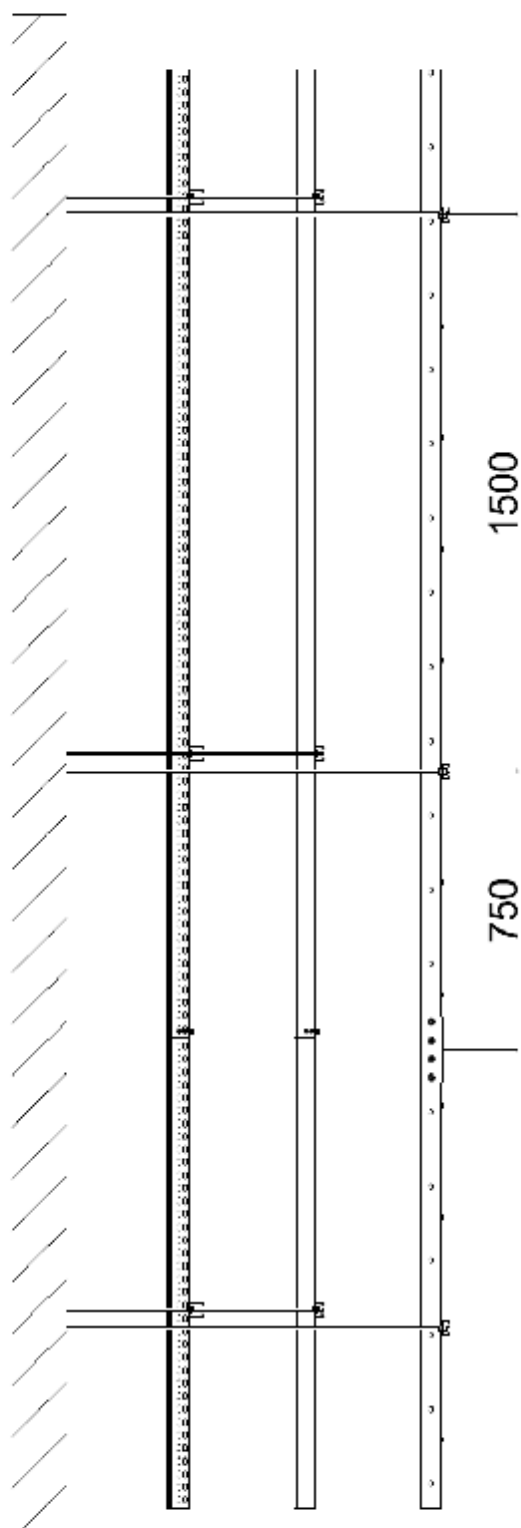
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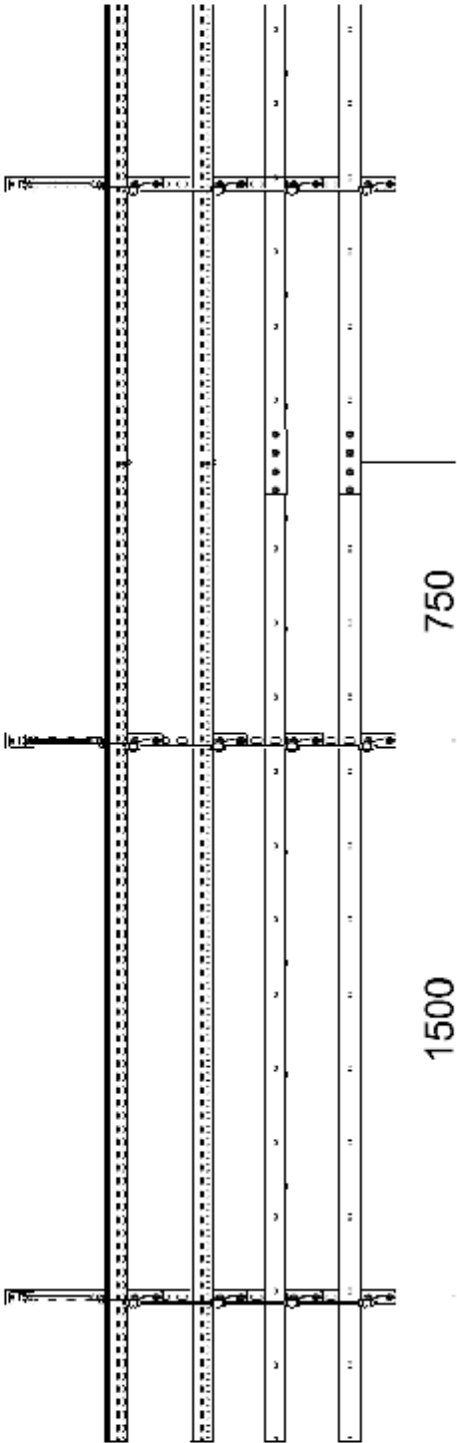
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J-J





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K-K





Technical Data Sheet

**R-HPTII-ZF – Carbon steel with Zinc / Aluminium coating throughbolt****BASIC PRODUCT INFORMATION****SUBSTRATE:**

- Cracked concrete C20/25 - C50/60 acc. EN 2006 : 2000
- Non-cracked concrete C20/25 - C50/60 acc. EN 2006 : 2000
- Reinforced and unreinforced concrete

FEATURES:

- Through anchoring
- Dry internal conditions
- Carbon steel finished in zinc / aluminium coating
Coating thickness min. 8µm
- ETAG 001-2 Option 1

MECHANICAL PROPERTIES

Size			M8	M10	M12	M16	M20
Nominal strength - tension	F_{tk}	[N/mm ²]	620	620	620	620	620
Nominal strength - shear	F_{sk}	[N/mm ²]	520	520	520	520	520
Nominal yield strength - tension	f_{yk}	[N/mm ²]	533.2	533.2	533.2	533.2	533.2
Nominal yield strength - shear	F_{yk}	[N/mm ²]	416	416	416	416	416
Cross sectional area - tension	A_s	[mm ²]	52.5	40.7	60.1	106.6	162.9
Cross sectional area - shear	A_s	[mm ²]	38.9	61.7	89.6	165.2	259.1
Section modulus	W_{el}	[mm ³]	34.3	68.3	119.6	299.5	588.3
Characteristic bending moment	$M^o_{Rk,1}$	[Nm]	19	38	67	167	328
Allowable bending moment	M	[Nm]	15.2	30.4	53.6	133.6	262.4

	R-HPTII-ZF Carbon steel with Zinc / Aluminium coating torque-controlled expansion anchors for use in cracked and non-cracked concrete					
	ETA-12/0309	WARNING: THE INFORMATION CONTAINED IN THIS TECHNICAL DATA SHEET IS THE PROPERTY OF KOEHLER RAWLPLUG IF Sp. z o.o. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF KOEHLER RAWLPLUG IF Sp. z o.o. IS PROHIBITED.	CERTIFICATE N°		R-HPTII-ZF-120021-01	
			WRITTEN:	Aleksandra Mielnik	DATA:	2012-06-29
			CHECKED:	-	DATA:	-
			APPROVED:	-	DATA:	-

Last update: 2013-04-08

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Technical Data Sheet



R-HPTII-ZF – Carbon steel with Zinc / Aluminium coating throughbolt

Size	Product Code	Anchor		Fixture		
		Diameter	Length	Max. thickness		Hole diameter
		d	L	t _{th, r}	t _{th, s}	d _h
		[mm]	[mm]	[mm]	[mm]	[mm]
M8	R-HPTII-ZF-08065/15	8	65	15	-	9
	R-HPTII-ZF-08080/15	8	80	30	15	9
	R-HPTII-ZF-08085/20	8	85	35	20	9
	R-HPTII-ZF-08100/35	8	100	50	35	9
	R-HPTII-ZF-08115/50	8	115	65	50	9
M10	R-HPTII-ZF-10065/5	10	65	5	-	11
	R-HPTII-ZF-10080/20	10	80	20	-	11
	R-HPTII-ZF-10095/15	10	95	35	15	11
	R-HPTII-ZF-10115/35	10	115	55	35	11
	R-HPTII-ZF-10130/50	10	130	70	50	11
M12	R-HPTII-ZF-12080/5	12	80	5	-	13
	R-HPTII-ZF-12100/5	12	100	25	5	13
	R-HPTII-ZF-12120/25	12	120	45	25	13
	R-HPTII-ZF-12135/40	12	135	60	40	13
	R-HPTII-ZF-12150/55	12	150	75	55	13
M16	R-HPTII-ZF-16100/5	16	100	5	-	18
	R-HPTII-ZF-16105/10	16	105	10	-	18
	R-HPTII-ZF-16140/20	16	140	40	20	18
	R-HPTII-ZF-16160/40	16	160	60	40	18
	R-HPTII-ZF-16180/60	16	180	80	60	18
M20	R-HPTII-ZF-20125/5	20	125	5	-	22
	R-HPTII-ZF-20160/20	20	160	40	20	22

	R-HPTII-ZF Carbon steel with Zinc / Aluminium coating torque-controlled expansion anchors for use in cracked and non-cracked concrete					
	ETA-12/0309	WARNING: THE INFORMATION CONTAINED IN THIS TECHNICAL DATA SHEET IS THE PROPERTY OF KOELNER RAWLPLUG IP Sp. z o.o. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF KOELNER RAWLPLUG IP Sp. z o.o IS PROHIBITED.	CERTIFICATE N°		R-HPTII-ZF-120021-01	
			WRITTEN:	Aleksandra Mielnik	DATA:	2012-05-29
			CHECKED:	-	DATA:	-
			APPROVED:	-	DATA:	-

Last update 2013-04-08

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R-DCA – Zinc electroplated wedge anchor

BASIC PRODUCT INFORMATION



SUBSTRATE:

- Cracked or non-cracked concrete C20/25 - C50/60 (Acc. EN 206-1)
- Reinforced and unreinforced concrete

FEATURES:

- Use accordance with ETAG001-06
- Not through anchoring
- Galvanized carbon steel acc. to ASTM A510 SAE 1008 or SAE 1010
- Coating thickness min. 5µm

MECHANICAL PROPERTIES

Size			M6	M8	M10	M12	M16	M20
Nominal tensile strength – tension	f_{tk}	[N/mm ²]	450	450	450	450	450	450
Nominal yield strength – tension	f_{yk}	[N/mm ²]	360	360	360	360	360	360
Cross sectional area – tension	A_s	[mm ²]	20.1	36.6	58.0	84.3	157.0	245.0
Elastic section modulus	W_{el}	[mm ³]	21.2	50.3	98.2	169.7	402.1	785.4
Characteristic bending resistance	$M^0_{Rk,2}$	[Nm]	13	31	61	106	251	490
Design bending moment	M	[Nm]	11	25	49	85	201	392

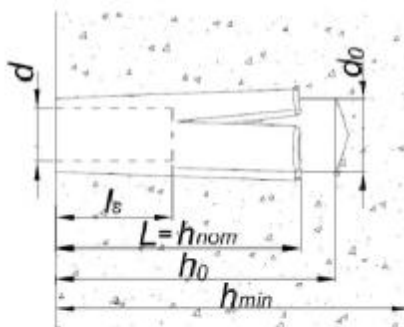
Size	Product code	Anchor				Fixture	
		Thread diameter	External diameter	Length	Thread length	Max. thickness	Hole diameter
		d	d _{nom}	L	L _s	t _{th}	d _f
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
M6	R-DCA-06-25	6.0	8.0	25	11	-	7.0
M8	R-DCA-08-20	8.0	10.0	30	13	-	9.0
M10	R-DCA-10-40	10.0	12.0	40	15	-	12.0
M12	R-DCA-12-50	12.0	15.0	50	20	-	14.0
M16	R-DCA-16-65	16.0	20.0	65	25	-	18.0
M20	R-DCA-20-80	20.0	25.0	80	35	-	22.0

	R-DCA – Zinc electroplated wedge anchor for use in cracked and non-cracked concrete.			
	ETA-13/0584 (2013)	WARNING: THE INFORMATION CONTAINED IN THIS TECHNICAL DATA SHEET IS THE PROPERTY OF ROELNER RAWLPLUG IF Sp. z o.o. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ROELNER RAWLPLUG IF Sp. z o.o. IS PROHIBITED.		CERTIFICATE N°
				R-DCA-130584-2013-01
				DATE: 2013-10-29
				DATE: -
				DATE: -



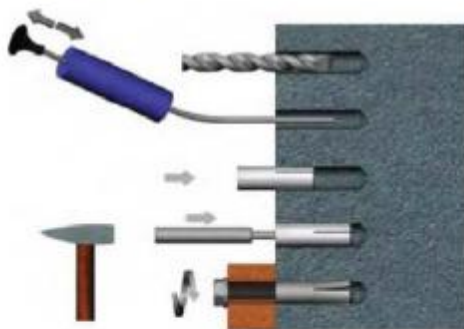
R-DCA – Zinc electroplated wedge anchor

INSTALLATION DATA



Size			M6	M8	M10	M12	M16	M20
Thread diameter	d	[mm]	6,0	8,0	10,0	12,0	16,0	20,0
Hole diameter in substrate	d ₀	[mm]	8,0	10,0	12,0	15,0	20,0	25,0
Installation torque	T _{inst}	[Nm]	4,5	11	22	38	98	130
Min. hole depth in substrate	h ₀	[mm]	30	32	42	53	70	85
Installation depth	h _{nom}	[mm]	25	30	40	50	65	80
Min. substrate thickness	h _{min}	[mm]	80	80	80	100	130	160
Screwing depth	min	L _{s, min}	[mm]	6	8	10	12	16
	max	L _{s, max}	[mm]	11	13	15	20	25
Min. spacing	S _{min}	[mm]	200	200	200	200	260	320
Min. edge distance	C _{min}	[mm]	150	150	150	150	195	240

INSTALLATION GUIDE



1. Drill a hole of required diameter and depth.
2. Remove debris and thoroughly clean hole with brush and pump.
3. Insert wedge anchor, slotted end first.
4. Use the setting tool to drive the internal wedge into the anchor.
5. Alternatively use mechanical setting tool with hammer action drilling machine.

R-DCA – Zinc electroplated wedge anchor for use in cracked and non-cracked concrete.					
	ETA-13/0584 (2013)	WARNING: THE INFORMATION CONTAINED IN THIS TECHNICAL DATA SHEET IS THE PROPERTY OF KOELNER RAWLPLUG IP Sp. z o.o. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF KOELNER RAWLPLUG IP Sp. z o.o IS PROHIBITED.	CERTIFICATE N°		R-DCA-130584-2013-01
			WRITTEN:	Marion Bober	DATE: 2013-10-29
			CHECKED:	–	DATE: –
			APPROVED:	–	DATE: –

Last update 2013-10-30

Page 2 of 4



GS - ceiling wedge anchor $\varnothing 6$

Technical Data Sheet

INSTALLATION DATA

Size	Product Code	Anchor		Substrate				Fixture	
		Diameter	Length	Hole diameter	Min thickness	Min hole depth	Min installation depth	Min spacing	Min edge distance
		d	l	d_0	h_{min}	h_0	h_{nom}	s_{min}	c_{min}
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
$\varnothing 6$	GS-06040	6	40	6	50	35	30	30	10
	GS-06065	6	65	6	50	35	30	30	35



Base Material
Non-cracked concrete
Cracked concrete
Solid brick
Features
Galvanized steel

INSTALLATION GUIDE

PERFORMANCE DATA - CONCRETE C20/25

Size	Embedment depth	h_{ef}	h_{ef}
$\varnothing 6$			30
TENSION LOADS			
NON CRACKED CONCRETE C20/25			
Characteristic resistance		N_{k1}	[kN]
Design resistance $\gamma_{M2}=2.5$		N_{k1}	[kN]
CRACKED CONCRETE C20/25			
Characteristic resistance		N_{k2}	[kN]
Design resistance $\gamma_{M2}=2.5$		N_{k2}	[kN]

* Partial safety factor is 2,5, unless other safety factors are applicable

PERFORMANCE DATA - SOLID BRICK 7.5MPa

Size	Embedment depth	h_{ef}	h_{ef}
$\varnothing 6$			30
TENSION LOADS			
SOLID BRICK 15MPa			
Characteristic resistance		N_{k3}	[kN]
Design resistance $\gamma_{M2}=2.5$		N_{k3}	[kN]

* Partial safety factor is 2,5, unless other safety factors are applicable



1. Drill a hole of required diameter.

2. Insert O anchor through fixture into hole and tap home.

4. Installed anchor.

GS - ceiling wedge anchor for cracked concrete		CERTIFICATE No		08/001/002/2011/TDS	
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AT-15-7637/2008		CHECKED:		DATE:	
RAWLPLUG		ALEXANDRA MIEHLIK		2011-08-31	
		MARIAN BOBER		2011-08-31	



WHO Frame fixing Ø 7,5
Technical Data Sheet

INSTALLATION DATA

Size	Product Code	Screw		Substrate										Fixture		
		Diameter	Length	Hole diameter **	Min thickness		Min hole depth		Min installation depth		Min spacing		Min edge distance		Thickness	
					Concrete	Other	Concrete	Aerated concrete	Concrete	Aerated concrete	Concrete	Aerated c.	Concrete	Other, aerated c.	Concrete	Other, aerated c.
d	l	d ₀	h _{min}	h ₀	h _{nom}		S _{min}		C _{min}		t _{fix}		d _f			
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
7,5	52	6	90	40	-	70	30	60	60	15	30	15	50	22	-	8
7,5	72	6	90	40	-	70	30	60	60	15	30	15	50	42	12	8
7,5	92	6	90	40	-	70	30	60	60	15	30	15	50	62	32	8
7,5	112	6	90	40	-	70	30	60	60	15	30	15	50	82	52	8
7,5	132	6	90	40	-	70	30	60	60	15	30	15	50	102	72	8
7,5	152	6	90	40	-	70	30	60	60	15	30	15	50	122	92	8
7,5	182	6	90	40	-	70	30	60	60	15	30	15	50	152	122	8
7,5	212	6	90	40	-	70	30	60	60	15	30	15	50	182	152	8

* Not covered by approval

** Not applicable in aerated concrete



Base Material
Concrete
Solid brick
Cavity brick
Aerated concrete
Stone
Honeycomb clay brick
Features
Carbon steel, zinc-plated

		WHO - Zinc electroplated screw for frame applications			
AT-15-6977/2006		WARNING: THE INFORMATION CONTAINED IN THIS TECHNICAL DATA SHEET IS THE SOLE PROPERTY OF RAWLPLUG LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF RAWLPLUG LTD IS PROHIBITED.			
		CERTIFICATE No			07/002/007/2011/TDS
		WRITTEN BY:			Aleksandra Mielnik
		CHECKED:			Marian Bober
		DATE:			2011-08-30
		DATE:			2011-08-30



WHO Frame fixing $\varnothing 7,5$

PERFORMANCE DATA - CONCRETE C20/25

Embedment depth	h_{ef}	[mm]	30
TENSION LOADS			
Characteristic resistance	N_{tk}	[kN]	5,1
Design resistance $\gamma_{M2}=3,0$	N_{td}	[kN]	1,7
SHEAR LOADS			
Characteristic resistance	V_{tk}	[kN]	5,1
Design resistance $\gamma_{M2}=3,0$	V_{td}	[kN]	1,7

PERFORMANCE DATA - SOLID BRICK 7,5MPa

Embedment depth	h_{ef}	[mm]	60
TENSION LOADS			
Characteristic resistance	N_{tk}	[kN]	2,1
Design resistance $\gamma_{M2}=3,0$	N_{td}	[kN]	0,7
SHEAR LOADS			
Characteristic resistance	V_{tk}	[kN]	2,1
Design resistance $\gamma_{M2}=3,0$	V_{td}	[kN]	0,7

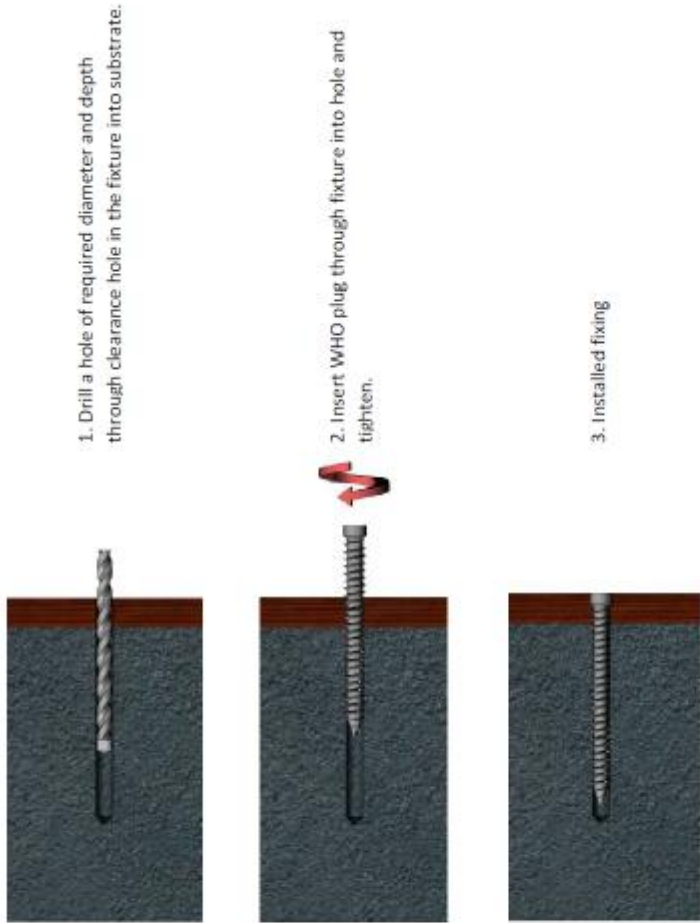
PERFORMANCE DATA - AERATED CONCRETE 400

Embedment depth	h_{ef}	[mm]	60
TENSION LOADS			
Characteristic resistance	N_{tk}	[kN]	1,1
Design resistance $\gamma_{M2}=3,0$	N_{td}	[kN]	0,4
SHEAR LOADS			
Characteristic resistance	V_{tk}	[kN]	1,1
Design resistance $\gamma_{M2}=3,0$	V_{td}	[kN]	0,4

PERFORMANCE DATA - HONEYCOMB CLAY BRICK

Embedment depth	h_{ef}	[mm]	60
TENSION LOADS			
Characteristic resistance	N_{tk}	[kN]	0,9
Design resistance $\gamma_{M2}=3,0$	N_{td}	[kN]	0,3
SHEAR LOADS			
Characteristic resistance	V_{tk}	[kN]	0,9
Design resistance $\gamma_{M2}=3,0$	V_{td}	[kN]	0,3

INSTALLATION GUIDE



	AT-15-6977/2006		WHO - Zinc electroplated screw for frame applications	
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	WRITTEN BY:	Alexandra Meirink	DATE:	2011-08-30
	CHECKED:	Marian Bober	DATE:	2011-08-30



Technical Data Sheet

OC Self drilling screw

INSTALLATION DATA

Size	Product Code	Screw			Substrate			Fixture			Max drilling thickness	Washer size
		Diameter	Length	Head size	Min thickness	Min spacing	Min edge distance	Thickness		t _{fix}		
								With washer	Without washer			
ø4,8	OC-48016	4,8	16	8	0,75	30	10	1,0	4,0	3,0	14	
	OC-48019	4,8	19	8	0,75	30	10	4,0	7,0	3,0	14	
	OC-48022	4,8	22	8	0,75	30	10	7,0	10,0	3,0	14	
	OC-48025	4,8	25	8	0,75	30	10	10,0	13,0	3,0	14	
	OC-48032	4,8	32	8	0,75	30	10	17,0	20,0	3,0	14	
	OC-48035	4,8	35	8	0,75	30	10	20,0	23,0	3,0	14	
	OC-48038	4,8	38	8	0,75	30	10	23,0	26,0	3,0	14	
	OC-48045	4,8	45	8	0,75	30	10	30,0	33,0	3,0	14	
ø5,5	OC-48055	4,8	55	8	0,75	30	10	40,0	43,0	3,0	14	
	OC-55022	5,5	22	8	1,00	30	10	4,0	7,0	5,0	16, 19	
	OC-55025	5,5	25	8	1,00	30	10	7,0	10,0	5,0	16, 19	
	OC-55032	5,5	32	8	1,00	30	10	14,0	17,0	5,0	16, 19	
	OC-55038	5,5	38	8	1,00	30	10	20,0	23,0	5,0	16, 19	
	OC-55045	5,5	45	8	1,00	30	10	27,0	30,0	5,0	16, 19	
	OC-55055	5,5	55	8	1,00	30	10	37,0	40,0	5,0	16, 19	



Base material
Steel S280GD according to EN 10346
Features
SCREW
Surface hardened carbon steel
Zinc electroplated min 16µm
WASHER
T.14, T16, T19 - zinc electroplated + EPDM
A14, A16, A19 - aluminium + EPDM

		ETA pending		WARNING: THE INFORMATION CONTAINED IN THIS TECHNICAL DATA SHEET IS THE SOLE PROPERTY OF KOELNER SA. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF KOELNER SA IS PROHIBITED.		OC Self drilling screw. Drilling capacity 3,0 / 5,0 / 6,0 / 8,0mm	
		N° of report OSK-2328/10/R11OSK		CERTIFICATE No		04/002/002/2011/TDS/ETA	
				WRITTEN BY:		DATE:	
				CHECKED:		DATE:	



Technical Data Sheet

OC Self drilling screw

INSTALLATION DATA cont.

Size	Product Code	Screw		Substrate			Fixture		Max drilling thickness	Washer size
		Diameter	Length	Head size	Min thickness	Min spacing	Min edge distance	Thickness		
		d [mm]	l [mm]	S _h [mm]	h _{min} [mm]	S _{min} [mm]	C _{min} [mm]	t _{fix} [mm]		
ø5,5	OC-55075	5,5	75	8	1,5	30	10	57,0	60,0	5,0
	OC-55090	5,5	90	8	1,5	30	10	72,0	75,0	5,0
	OC-55120	5,5	120	8	1,5	30	10	102,0	105,0	5,0
ø6,3	OC-63019	6,3	19	10	1,00	30	10	2,0	5,0	6,0
	OC-63022	6,3	22	10	1,00	30	10	5,0	8,0	6,0
	OC-63025	6,3	25	10	1,00	30	10	8,0	11,0	6,0
	OC-63032	6,3	32	10	1,00	30	10	15,0	18,0	6,0
	OC-63038	6,3	38	10	1,00	30	10	21,0	24,0	6,0
	OC-63045	6,3	45	10	1,00	30	10	28,0	31,0	6,0
	OC-63055	6,3	55	10	1,00	30	10	38,0	41,0	6,0
	OC-63075	6,3	75	10	1,00	30	10	58,0	61,0	6,0
	OC-63090	6,3	90	10	1,00	30	10	73,0	76,0	6,0
	OC-63120	6,3	120	10	1,00	30	10	103,0	106,0	6,0



Base material	Steel S280GD according to EN 10346
Features	
SCREW	Surface hardened carbon steel
	Zinc electroplated min 16µm
WASHER	
	T14, T16, T19 - zinc electroplated + EPDM
	A14, A16, A19 - aluminium + EPDM

	ETA pending N° of report OSK- 2328/10/R110SK		WARNING: THE INFORMATION CONTAINED IN THIS TECHNICAL DATA SHEET IS THE SOLE PROPERTY OF KOELNER SA. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF KOELNER SA IS PROHIBITED.		OC Self drilling screw. Drilling capacity 3,0 / 5,0 / 6,0 / 8,0mm	
	CERTIFICATE No		04/002/002/2011/TDS/ETA		WRITTEN BY: Aleksandra Mielnik	
	CHECKED: Marian Bober		DATE: 2011-09-07		DATE: 2011-09-07	



7. FINAL PROVISION

- § This report details the method of construction, the test conditions and results obtained when the specific element of construction described herein was following the procedure outlined in EN 1363-1, and where appropriate STN 92 0205. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.
- § Because of the nature of the fire resistance testing and consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.
- § The test results refer only to the tested subjects. This test report is not an approval of the tested product by the test laboratory or the accreditation body overseeing the laboratory's activities. The test was carried out on testing equipment that is the property of FIRES, s.r.o., Batizovce. Without the written permission of the test laboratory this test report may be copied and/or distributed only as the whole. Any modifications of the test report can be made only by the fire resistance test laboratory FIRES, s.r.o., Batizovce.

Approved by:

Prepared by:

Ing. Štefan Rástocký
leader of the testing laboratory



Bc. Dávid Šubert
technician of the testing laboratory

8. NORMATIVE REFERENCES

EN 1363-1: 2012	Fire resistance tests. Part 1: General requirements
STN 92 0205:2014	Fire behaviour of construction products and building constructions. Circuit integrity maintenance of cable systems. Requirements, testing and classification.
DIN 4102 – 2:1977-09	Fire behaviour of building materials and elements - requirements and testing
DIN 4102 – 12:1998-11	Fire resistance of electric cable systems required to maintain circuit integrity
ZP-27/2008 PAVUS	Test method for determination of functionality class of cables and cable loadbearing constructions - cable circuits in case of fire

THE END OF THE TEST REPORT